Kommerskollegium
2008:3

The relationship between international trade and foreign direct investments for Swedish multinational enterprises

Kommerskollegium
National Board of Trade

The National Board of Trade

The National Board of Trade is a governmental agency and the central administrative body in Sweden dealing with foreign trade and trade policy. The Board provides the Government with analyses and recommendations.

Within the framework of the European Union, the Board works for an effective internal market, open trade policy in the EU and a strengthened multilateral trading system within the WTO. The Board also acts as ombudsman for free trade and free movement within the EU as partners of the Solvit network.

www.kommers.se

Executive summary

In the last decades of globalization, the world economy has become increasingly more integrated through international trade and foreign direct investment. One of the primary effects of the new economic environment is that firms are now more flexible in how they may produce and deliver goods and services to foreign destinations.

Recent research has presented empirical evidence of a declining world market share of Swedish exports in merchandise trade. This development coincides with an increased degree of internationalization in the Swedish firm production networks, which indicates that Swedish firms may have shifted the assembly of goods to the sales destinations. At the heart of these features are the relationship between home country exports and foreign direct investments and the activities of Swedish multinational firms, in their choice in how to serve foreign markets, by either exports or foreign direct investments, or both.

When reviewing the theory, it can be concluded that theories on FDI have become more complex in recent years, as they try to encompass the new economic environment. This gives way to a more complex relationship where it can be argued that a firm's decision to expand encompasses a combination of both exports and foreign direct investments in which both modes are determined simultaneously by factors such as firm and plant level economies of scale, trade costs, market access, and differences in endowments.

This study is based on recent theoretical and empirical literature and examines how international trade and FDI are related by evaluating the impact of increased world economy and trade liberalization on the Swedish exports and foreign affiliate production.

The results, which are based on firm level data on Swedish multinational firms within a three-country model of FDI with heterogeneous firms, show that a growing world economy increases Swedish exports as well as foreign direct investments. However, based on the relative numerical importance of the various sales types, it can be concluded that in relative terms, a world income growth promotes FDI more than the Swedish firm exports, which is consistent with theory. Hence, as the world economy grows, Swedish multinational firms may choose to supply foreign markets through foreign affiliates instead of exports from Sweden, in relative terms.

The results further show that the decline in trade costs increase Swedish firm exports as well as the FDI. The numerical importance of the various sales types does however show that the two effects neutralize each other.

Contents

This report has been written by Stefan Westerberg with the assistance of Fredrik Andersson, both at the National Board of Trade.

Section 4 and section 5 have been written with the help of Pehr-Johan Norbäck at the Research Institute of Industrial Economics, and Dieter Urban at Johannes Gutenberg University Mainz.

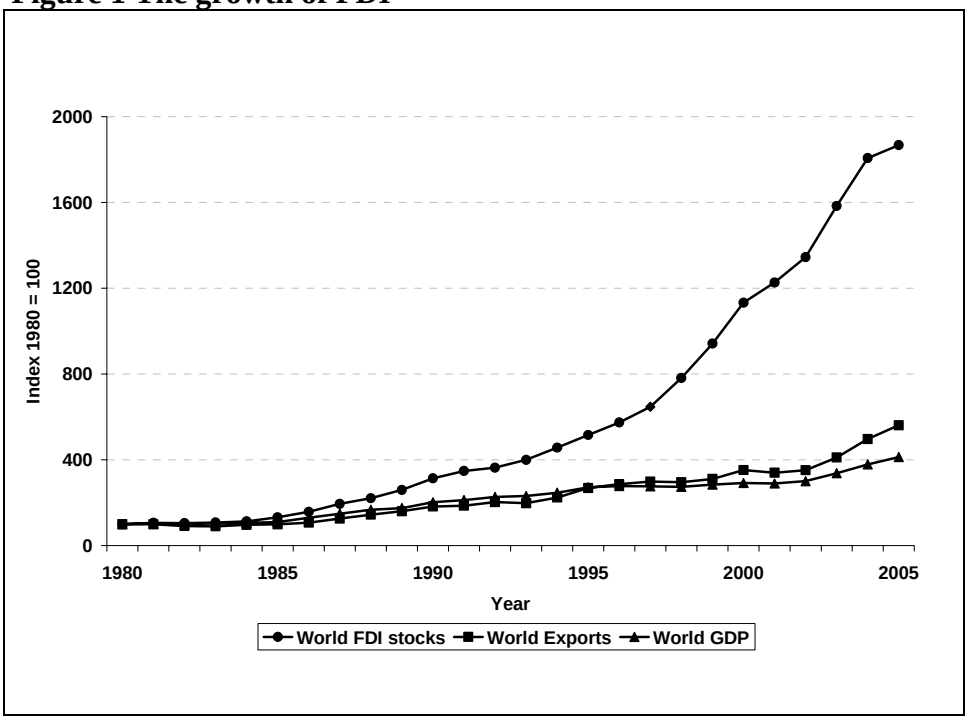
The conclusions in this working paper it is not meant to represent the position or opinions of neither the Research Institute of Industrial Economics nor the University of Mainz. Any errors are the fault of the authors.

Copies of working papers can be requested from the National Board of Trade at <www.kommers.se>

1 Introduction

In the last decades of globalization, there has been a substantial growth in world income and world trade. Still, as illustrated in Figure 1, one of the most striking features of the globalization process is the rise in foreign direct investment (FDI), by multinational enterprises (MNEs).[1] Over the period 1980 to 2005, FDI increased 18 times over its initial value, while merchandise trade and domestic production, respectively, increased 6 times and 4 times.[2]

Figure 1 The growth of FDI



Source: UNCTAD.
Note: Index numbers, 1980=100.

One of the most interesting features of FDI is that, by its very definition, it comprises a much deeper integration, compared to for example merchandise trade, by the establishment of a "lasting relationship" (OECD, 1996) that connects the factors of production of the countries involved. Therefore, FDI cannot only be seen as a tool for firms to supply goods

[1] A multinational firm refers to a firm which has a controlling right, typically more than a 50 % of the equity share, in a subsidiary or affiliate in a country other than in the country of the parent company. The controlling right implies a "lasting interest" in the management of that enterprise, enabling the MNE to create, expand or develop the activities of the affiliate. A detailed definition of FDI and MNEs can be found in the appendix.

[2] The amplified surge of FDI could further be depicted by the significant increase in negotiated Bilateral Investment Treaties (BITs), going from 134 to approximately 2500, between 1980 and 2005.

and services to foreign markets, but also as a mechanism to coordinate production and sales schemes between countries.

Historically the production networks have not been very integrated, as foreign affiliates mostly functioned as independent units and were only loosely integrated into their overall MNE network. Today, however, an increasing number of MNEs are engaged in complex integration strategies, in which parts of the value-added chain can be located abroad while remaining fully integrated in the MNE network as a whole. Thus, one of the primary effects of the new economic environment, in which the world economy has become increasingly more integrated, facilitated by technological advancements, increased specialization, and financial market liberalizations, is that firms are now more flexible in how they may produce and deliver goods and services to foreign destinations.

There are today 77.000 MNEs (parent firms) world wide, with around 770.000 affiliates in foreign countries (UNCTAD, 2006), which shape the world economy through their central position in international trade, information technology, internationalization of production and global FDI. Foreign-owned MNEs employ about one out of five workers in European manufacturing (Barba-Navaretti and Venables, 2004). MNEs – the parents and their affiliates taken together – account for up to two thirds of world commodity trade, and as much as a third of world trade takes place within multinationals (UNCTAD (1996) and Helpman (2006)). Multinational firms are further more productive, pay higher wages and have access to technologies, marketing and know-how which is not available to local firms (Barba-Navaretti and Venables, 2004).

Global investments by multinational firms are thus important in the globalization process as they bring about significant economic benefits for both the receiving host economy and the sending home economy. But there are also concerns. For the home countries of multinational firms, there is often a fear that outward FDI takes place at the expense of home country exports and production activities, and hence that the foreign expansion can lead to structural adjustment costs in the home country. When production activities are re-allocated abroad there is also a fear that headquarters services like research and development (R&D) will follow, with a hollowing out and a dispersion of the knowledge base in the home country.

The effects of outward FDI on production and exports is particularly important for a small country like Sweden in which the industry is dominated by a small number of large firms.

Recent research (Nordström, 2005) has presented empirical evidence of a declining world market share of Swedish exports in merchandise trade. This coincides with an increased degree of internationalization in the Swedish firm production networks. The Swedish outward FDI stocks increased from 3.57 to 202.8 Billions USD between 1980 and 2005, and as a share of GDP, Swedish outward FDI stocks grew from 2.75 % to 56.52 %.

The fear from a policy standpoint is that the declining world market share of Swedish exports could imply a decline in Swedish competitiveness, undermining the basis for future Swedish prosperity. Apart from such a interpretation, there may also be less dramatic ones. For example, Swedish firms may have changed the mode of serving foreign markets. Instead of exporting to foreign destinations, they may have shifted the assembly of goods to the sales destinations while concentrating know-how related activities such as management, R&D and marketing at home.[3]

At the heart of these movements are the activities of Swedish multinational firms and their choice in how to serve foreign markets, by either exports or foreign direct investments, or both. In a growing world market, those firms may be interested in expanding abroad, substituting exports from Sweden for local production in their foreign affiliates both for local sales in the host countries and for exports to third markets. Such a development is likely to occur in a world where large countries and subcontinents like China, India or Eastern Europe are increasingly taking active part in the world economy.

The purpose of this report is to give both a theoretical and empirical overview on how FDI and international trade are related. In particular, the report will:

- Present stylized facts on both international trade and foreign direct investments, in order to acquire a deeper understanding of the two components and of other issues, which are related to the internationalization of firms;
- Analyze the relationship between international trade and FDI in order to determine whether international trade and FDI are complements or substitutes to each other. This by reviewing the relevant theoretical and empirical literature and further empirically assess the linkage between home country exports and foreign affiliate sales on Swedish multinational firms.

Concerning the question of whether outward FDI enhances or displaces exports of the home country, this report confines its analysis to manufacturing, excluding services.[4] The study discusses very sparsely the effects of FDI and trade on the host and home country such as the labor market. Focus will be on how FDI and home country exports are related within a firm (so-called off-shoring). The analysis will not discuss how FDI affects contractual relationships outside the firm (so-called outsourcing). Since the study focuses on the relationship between international trade

[3] The trade balance may thus contain the merchandise trade, taking place increasingly abroad. But it does not contain the counterbalancing intangible knowledge service flows into which Sweden specializes.

[4] The quantitative analysis will be conducted on firms within the manufacturing sector.

and FDI for Swedish MNEs, the Swedish performance in exports as a world market share will not be addressed.

The empirical analysis of this report rests on both data aggregated at the country level and disaggregated at the firm level. The former are taken from United Nations Conference on Trade and Development (UNCTAD), Organization for Economic Co-operation and Development (OECD), and United Nations Commodity Trade Statistics Database (UN Comtrade). The latter are taken from the Research Institute of Industrial Economics (RIIE) database, which contains almost all Swedish MNEs in the manufacturing sector and is available for the years: 1965, 1970, 1974, 1978, 1986, 1990, 1994, 1998 and 2003.

To capture the relation between FDI and international trade, we attempt to understand the underlying forces that drive both international trade and FDI, using micro data on Swedish multinational firms. Encompassing the recent theoretical and empirical literature, this study focuses on the role played by the growth of the world economy and the substantial fall in trade cost over time. The analysis in this report is conducted with micro data on Swedish multinational firm, based on a three-country model of FDI with heterogeneous firms. The use of firm level data is useful and indeed the only way to identify the underlying forces that drive international trade and FDI simultaneously.

The results from the quantitative analysis show that a growing world economy increases Swedish exports as well as foreign direct investments. However, based on the relative numerical importance of the various sales types, it can be concluded that in relative terms, a world income growth promotes FDI more than the Swedish firm exports. The results further show that the decline in trade costs increases Swedish firm exports as well as the FDI. The numerical importance of the various sales types does, however, show that the two effects neutralize each other.

The main audience for the report will be policy makers in the area of trade and investment, but also general economic policy makers who want to get a non-technical, yet rigorous insight into the up-to-date knowledge on how international trade and FDI interact.

Chapter 2 presents the basic theory of FDI and a general review of the current state of empirical research on the relationship between trade and FDI. Chapter 3 examines the pattern of outward FDI by Swedish firms, illustrating the degree of internationalization in Swedish production. Chapter 4 presents stylized facts on the relationship between exports and FDI, within Swedish MNEs. Chapter 5 presents an empirical examination of the relationship between trade and FDI, using econometric analysis, and chapter 6 summarizes the conclusions.

2 The relationship between FDI and trade

In order to discuss the relationship between trade and FDI, we first need to explain the mechanisms behind firms investing abroad, which is the purpose of this chapter. [5]

The theory of MNEs has, in combination with the heightened interest in FDI and MNEs, been expanded and fine-tuned during the years. The theoretical literature on multinational firms rests on the seminal work by Dunning (1974, 1985, and 1988) in the so-called OLI approach, which was one of the first contributions in theoretical analyses of the multinational firms.[6] Briefly, the OLI approach argues that multinational operations are determined by three factors:

- *(O) ownership-specific advantages*, in which firms of one nationality possess advantages relative to those of another nationality in sourcing a market. This could be in terms of firm-specific assets such as patents, technologies, know-how, or a brand name;
- *(L) location-specific advantages*, in which it is profitable to combine the use of internalized ownership-specific advantages in a foreign country rather than in the home country;
- *(I) internalization-specific advantages*, in which firms find it profitable to use these advantages themselves through affiliates rather than to lease them to firms in foreign countries.

In earlier literature, exports and FDI were seen as two alternative strategies for a certain product, and the relationship was characterized by a linear sequential step-by-step movement, running mostly from trade to FDI. I.e., firms could either produce at home and export to foreign destinations, or produce abroad and substitute home country exports with foreign affiliate local sales. In the early models, economies of scale and trade costs were key elements in the decision process, as the exports were decomposed into lower fixed costs and higher variable costs. Accordingly, when firms expanded by entering new markets through FDI, the fixed costs increased but the variable costs decreased. For a specific firm, this implied a sequential movement going from exports to FDI as the total demand for the firm's goods increased and exceeded a given amount.

[5] See also Herzing, Norbäck and Persson (2007).
[6] The OLI approach is a combination of the "Structural Market Imperfection Theory" by Kindleberger (1969) and Hymer (1976) and the "Natural Market Imperfection Theory" developed by Buckly and Casson (1976), in which both theories argued that firms become multinational due to market imperfections.

The OLI framework has later on been formalized, for instance, in Markusen (1984, 1997, 2002), Horstmann and Markusen (1992), Markusen and Venables (1998, 2000), Helpman (1984, 1985), Ethier (1986), Ethier and Markusen (1996), and Grossman and Helpman (2002). A detailed description of the literature can be found in Barba-Navaretti and Venables (2004).

Below we will give a simple overview of how the theoretical work on multinational enterprises and FDI has been applied and then show how we can use the theory to make predictions about the relationship between international trade and FDI.

2.1 Horizontal FDI – getting better market access

Horizontal FDI refers to market seeking investments, in which the MNE duplicates the production and produces similar products or services in multiple locations.

One of the key components in the horizontal FDI model, developed by Markusen (1984), is that firms choose to serve foreign markets through foreign affiliate local sales, instead of via exports. This is done in order to achieve better market access and reduce costs coming from tariffs and transportations. Thus, the reason for firms investing abroad can be concluded in a trade-off between the gains from being near the consumer and the losses originating from production dispersion, which is illustrated in the proximity-concentration hypothesis by Brainard (1997).

A simple example:

Imagine a truck producer in a developed country H (“Home”) who plans to develop, manufacture and sell a new model. This may involve years of research and development (R&D) with significant fixed costs incurred. In order to ensure that the new model will be a profitable investment, the firm needs to ensure a sufficiently large volume of sales.

One way for the firm to increase its sales, is to expand activities beyond the domestic market, and begin to export to a foreign country, which we refer to as country F. This is shown in Figure 2.

Suppose now that there are significant trade barriers to the export market in country F (marked out as t_{FH} in Figure 2), for instance, emerging through tariffs on imported trucks or transport costs. If the firm invests into an additional plant in country F and produces the model for the local market in a foreign affiliate, it can increase its sales further by avoiding trade costs. This is shown in Figure 3 where the investment refers to the same activity, production of trucks, taking place at home and abroad.

Figure 2 International Expansion: Exports

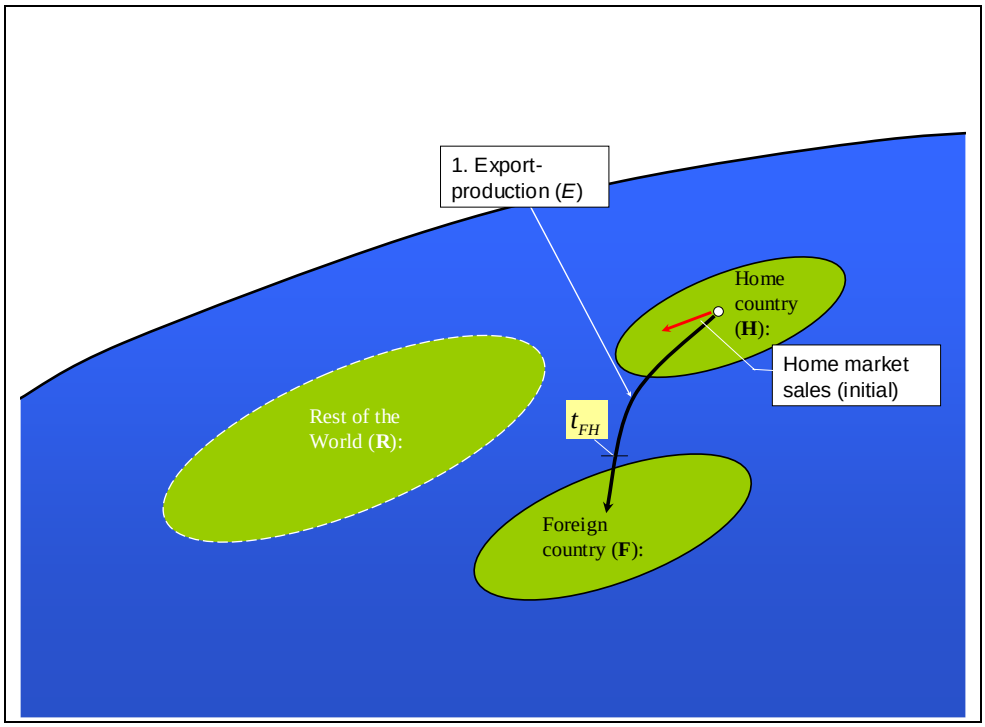
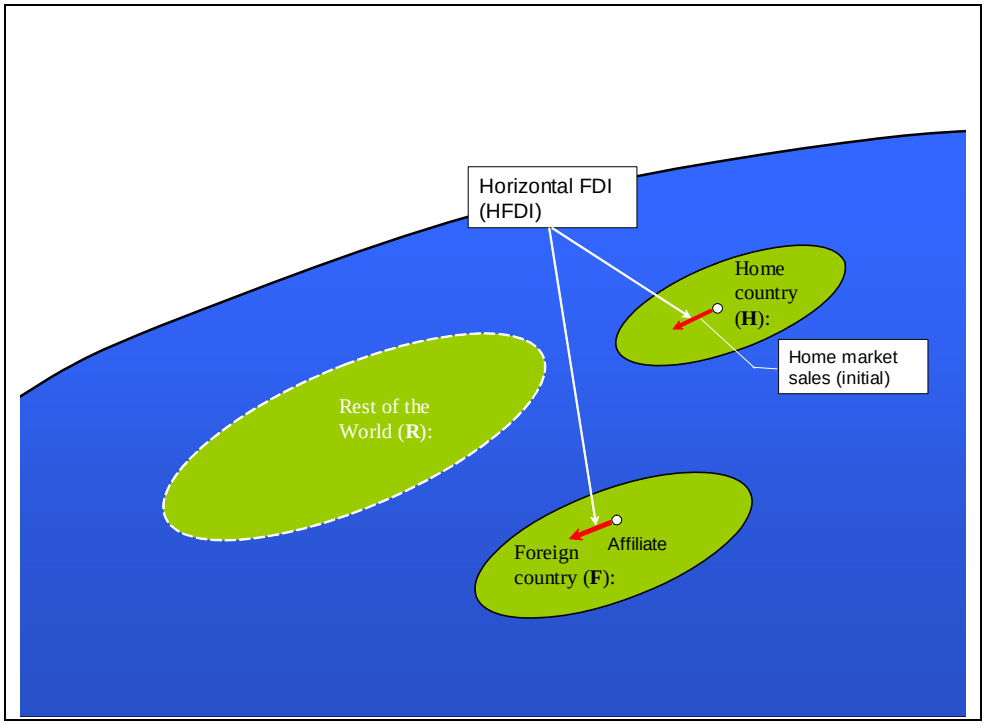


Figure 3 International Expansion: Horizontal FDI



The firm's decision between concentrating production in the home country H (and selling to the foreign market in country F with exports) and FDI (where production and sales in the foreign market takes place in an affiliate in country F) will be given from how much is gained by increasing sales by avoiding the trade costs associated with exports t_{FH} and how much is lost in scale economies with FDI. In this context, proximity to consumers will be more important in large markets where consumers have a high willingness to pay since the savings on trade costs will increase with the amount sales in the market.

FDI is predominantly driven by market-access motives

In the public debate, there is often the view that FDI flows from developed high-wage countries to developing low-wage countries are associated with jobs being relocated from high wage countries to low wage countries. Looking at FDI flows it is true that it is predominantly firms from developed countries that invest abroad. However, these investments are most likely to be destined for other rich countries. This can be seen in Table 1 and Table 2, where we note that Western European countries and the US are simultaneously the largest investors as well as the largest recipients of FDI flows.

These results, which show that the bulk of FDI flows between developed countries with large markets, are consistent with the theory of Horizontal FDI. There is also ample evidence based on more disaggregate data that market-access driven FDI is a prime explanation for investing abroad.

For instance, Japanese car producers like Honda, Nissan and Toyota have placed car production in the United Kingdom as a response to tariffs and trade costs in the EU market (Barba-Navaretti and Venables, 2004).

Several studies (for instance, Brainard, 1997 and Braconier, Norbäck and Urban, 2005,a) find that the size of the market – either measured through the size of host country GDP, or the market access to nearby markets, has a significant effect on FDI by the U.S. and Swedish MNEs.

Another stylized fact is that MNEs are often large firms with advanced products, active in high-tech sectors. The starting point for this explanation of FDI is that within high-tech or knowledge intensive industries, a significant part of a firm's total costs can be attributed to costs associated with developing or inventing new products or technologies.

Table 1 Distribution of outward FDI stocks

Region/economy	1980	1985	1990	1995	2000	2005
World (Millions of US dollars)	**571 228**	**755 622**	**1 791 092**	**2 949 168**	**6 471 435**	**10 671 889**
Regional distribution						
Developed economies	**87.3%**	**88.4%**	**91.7%**	**88.5%**	**86.2%**	**86.9%**
Europe	41.1%	44.1%	49.5%	50.5%	56.3%	58.5%
European Union	37.2%	40.7%	45.2%	44.9%	47.1%	51.3%
Other developed Europe	3.9%	3.5%	4.3%	5.6%	9.2%	7.2%
North America	41.9%	37.3%	28.8%	27.7%	24.0%	23.0%
Other developed countries	4.4%	7.0%	13.4%	10.3%	5.9%	5.4%
Developing economies	**12.7%**	**11.6%**	**8.3%**	**11.4%**	**13.5%**	**11.9%**
Africa	1.3%	1.5%	1.1%	1.1%	0.7%	0.5%
Latin Am. and the Carib.	8.5%	7.0%	3.4%	3.1%	3.3%	3.2%
Asia and Oceania	2.9%	3.2%	3.8%	7.2%	9.5%	8.2%
South-East Europe and the CIS	**0.0%**	**0.0%**	**0.0%**	**0.1%**	**0.3%**	**1.2%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: UNCTAD, World Investment Report, various issues

Table 2 Distribution of inward FDI stocks

Region/economy	1980	1985	1990	1995	2000	2005
World (Millions of US dollars)	**561 403**	**814 481**	**1 789 303**	**2 766 114**	**5 802 933**	**10 129 739**
Regional distribution						
Developed economies	**75.6%**	**72.7%**	**79.3%**	**74.7%**	**68.5%**	**70.3%**
Europe	45.2%	37.6%	45.6%	44.8%	39.6%	46.7%
European Union	42.5%	35.4%	42.9%	42.0%	37.6%	44.4%
Other developed Europe	2.7%	2.2%	2.6%	2.8%	2.0%	2.3%
North America	24.4%	30.6%	28.4%	23.8%	25.3%	19.6%
Other developed countries	6.0%	4.5%	5.4%	6.1%	3.6%	4.0%
Developing economies	**24.4%**	**27.3%**	**20.7%**	**25.0%**	**30.3%**	**27.2%**
Africa	6.9%	5.0%	3.3%	3.1%	2.6%	2.6%
Latin Am. and the Carib.	7.1%	8.5%	6.6%	7.1%	9.3%	9.3%
Asia and Oceania	10.5%	13.8%	10.8%	14.8%	18.4%	15.4%
South-East Europe and the CIS	**0.0%**	**0.0%**	**0.0%**	**0.3%**	**1.2%**	**2.5%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: UNCTAD, World Investment Report, various issues

Intangible assets

The knowledge of how to produce and sell the new truck – its design, technology and brand – can be viewed as an *intangible asset* which can be transferred and used in production and sales in the affiliate in the foreign country. FDI can therefore be seen as a source of firm-level scale economies, since no duplication of the costs for the usage of intangible assets arise when expanding sales and production across borders.

The fact that such knowledge capital is easily transferred across units may also be a reason for the firm to keep production and sales internally within a subsidiary in a foreign country. By not licensing the technology or production to local firms or agents, the firms can reduce the risk of leakage of the new technology to competitors. The firm may also more easily monitor the quality in production.

The relationship between trade and FDI in the Horizontal FDI model

What is then the relationship between FDI and trade predicted by the Horizontal FDI model? A comparison of Figures 2 and 3 gives the following observation.

Observation 1: *Horizontal FDI is, in general, a substitute to home country exports, since foreign production in an affiliate in country F replaces production and exports from the home country H.*

Hence, in the horizontal FDI model, firms will prefer FDI instead of exports, to supply goods and services. This can be explained by the fact that the proximity gains from being located near the consumers are higher than the concentration gains, created from allocating the production in a single location.

That is, FDI arising with the purpose of achieving better market access will, in general, replace exports of final goods from the home country of final goods. A remark is due, however: Foreign production may also generate new export possibilities from the home country since imported inputs and parts may be exported to final production abroad. We will discuss such complementary effects in the next section. Note also that while foreign production fully replaces home country exports of goods, the home part of the firm still “exports” the services of its intangible assets: production abroad requires headquarters services such as R&D and marketing which are often located in the home country of the MNE. As these intangible assets are difficult to measure one may overestimate the substitution effect.

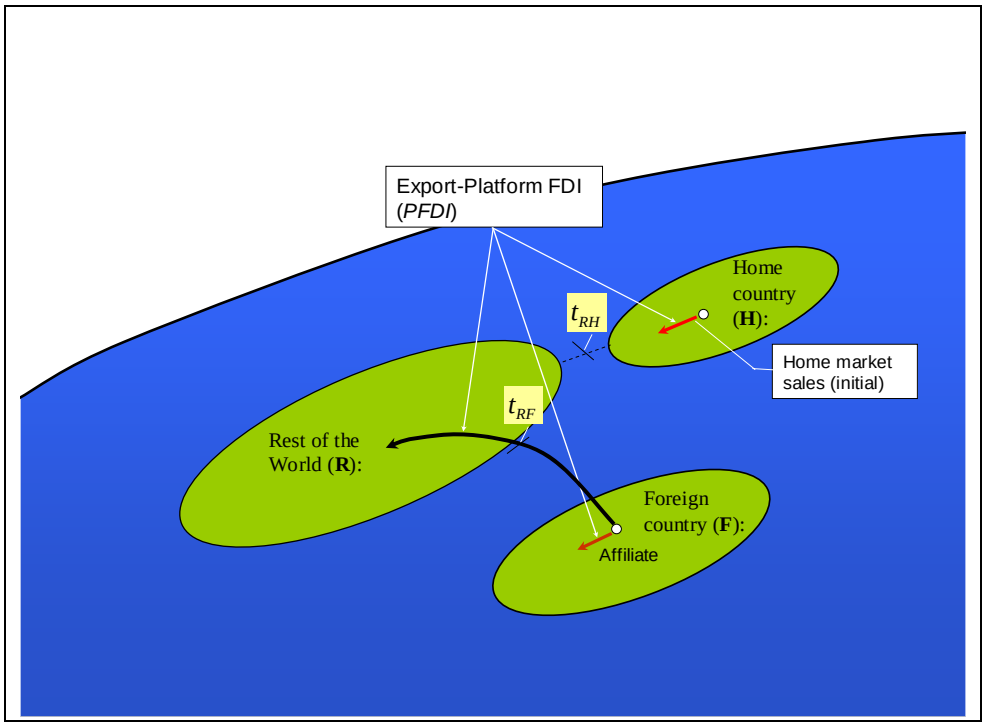
Platform FDI: export-driven FDI

Platform FDI can be seen as a more intricate form of horizontal FDI. Platform FDI refers to market-access driven investments, where the MNE locates production in a foreign country positioned in proximity to the export market, as a platform, in order to facilitate affiliate exports to that market. Therefore, platform FDI generates exports from foreign affiliates. This is shown in Figure 4.

A simple example

Suppose that a truck producer also wants to target the market in a third country, which we label country R ("Rest of the World"). The truck producer may then place the affiliate in country F ("Foreign"), in order to sell to the market in country R. This will be profitable if country F is located close to country R, so that trade costs (and other operating costs) for supplying the market in country R from country F (marked out as t_{RF} in Figure 4) are lower than the trade cost for serving country R from the home country (marked out as t_{RH} in Figure 4).

Figure 4 International Expansion: Platform FDI



The importance and presence of this mode of FDI, which gives an additional explanation for why firms invest abroad, has been well documented in Hanson, Mataloni, and Slaughter (2005), which concluded that there has been a growing presence of export platform FDI integration strategies after the establishment of North American Free Trade Agreement (NAFTA).

The relationship between trade and FDI in the Platform FDI model

It follows that when FDI is of the "platform" type, the following observation arises:

Observation 2: *Platform FDI can impede home country exports and at the same time facilitate international trade. While the production in the host country F can lower export from the home country H, it may generate affiliate exports from country F to country R.*

In sum, horizontal FDI, which also includes platform FDI, explains why similar products are produced locally by MNEs in different parts of the world. The theory concludes that local production can increase sales volume by avoiding trade costs in exports. The theory further concludes that, in large markets with high incomes and a high willingness to pay, new investments in additional plants for local production and sales will be profitable, despite the extra investment costs. Thus, the theory of horizontal FDI explains why investments predominantly flow from rich countries to rich countries. Finally and most important, horizontal investments, made in order to increase market access, are likely to replace exports from the home country.

2.2 Vertical FDI – access to cheap factors of production

Vertical FDI refers to investments where the production process, or value chain, is fragmented into different parts in order to take advantage of differences in factor prices between countries or regions. That is, FDI where the prime motive is to obtain access to cheap production factors is labeled "Vertical FDI" in the literature. The vertical FDI model was first developed by Helpman (1984).

In general, we can think of the organization of production and sales within MNEs as a production network, where different parts of the production process is located in different countries in order to take advantage of factor price differences.

This geographical dispersion of production will reduce production costs. Since different production stages require different intensities of skilled labor, and factor prices may differ across countries, it will be profitable to locate production stages which make intensive use of less skilled labor in less developed countries (where less skilled labor is relatively abundant and therefore cheap). Likewise, activities which make intensive use of skilled labor, such as research and development (R&D), are located where there are abundant resources of skilled labor in developed countries, making them relatively cheap there.

WTO (1998) provides an illustrative example of a production network.

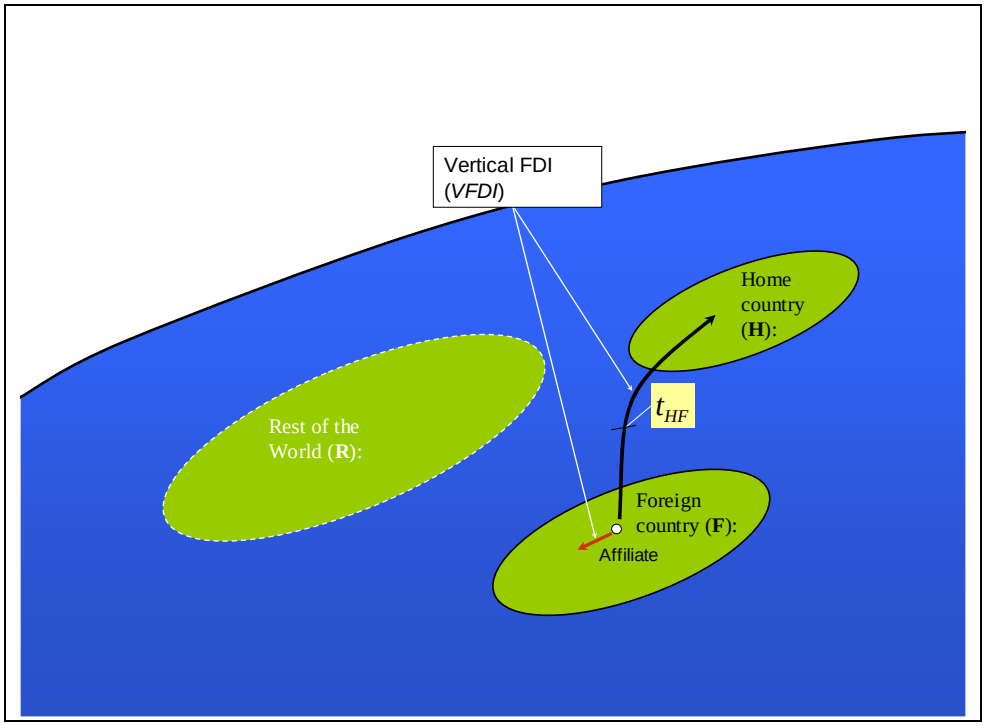
- 38 % of the production value of a typical American car originates from the US.
- In foreign activities, assembly takes place in South Korea and represents 30% of the production value.

- Components and advance parts originate from Japan and account for 17.5 %.
- Design of the car is done in Germany accounting for 7.5%.
- Smaller parts are sourced from Taiwan and Singapore at 4 % of the production value.
- Marketing and advertising is done in the UK at 2.5% of the production value.
- Finally, computer services are done from Ireland and Barbados accounting for 1.5 % of the production value.

A simple example

For instance, if the investment by the truck producer in our example is made in country F, and the primary motive is to reap the benefits of lower factor (wage) costs, we would define this investment as a vertical FDI. This is shown in Figure 4, where the firm shuts down its production in the home country H and concentrates production in country F from which it supplies the local market and exports back to the home market.

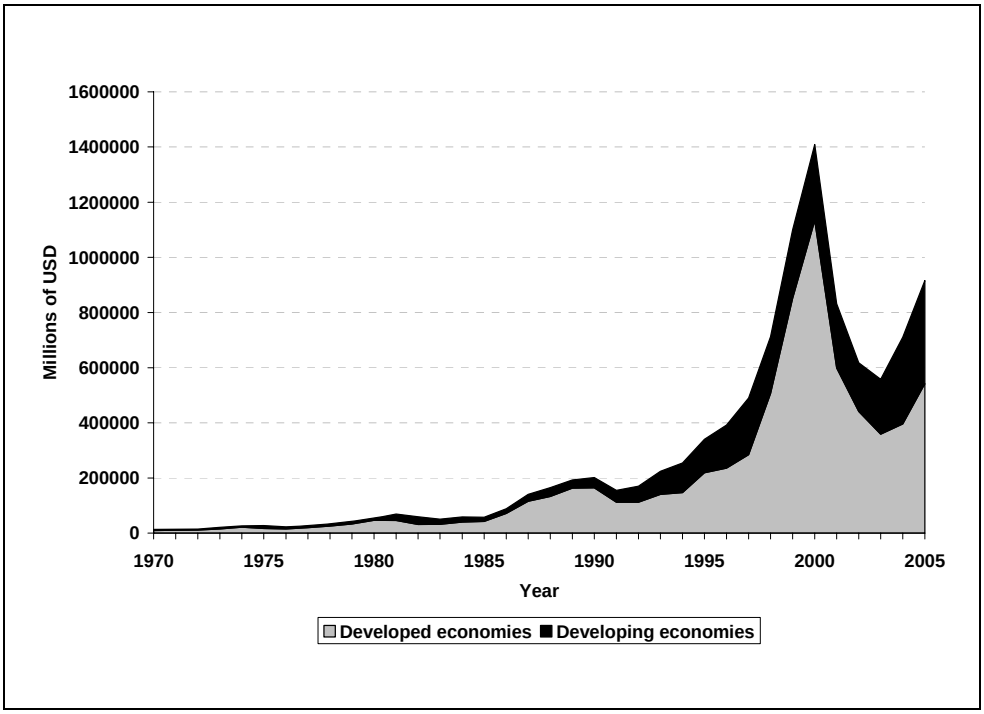
Figure 5 International Expansion: (Simple) Vertical FDI



An increasing importance of production fragmentation

In recent years there is evidence that developing countries are receiving a larger share of FDI. In Figure 6, we note that FDI flows going to developing countries has increased from about 3.9 Billion USD (16% of World FDI flows) in 1980 to about 373 Billion USD (36 % of World FDI flows) in 2005. A portion of these investments are likely driven by access to lower factor costs in production.

Figure 6 World FDI inflows, to developed and developing economies



Source UNCTAD, various issues

Trade and FDI in the Vertical FDI model

Since vertical FDI implies a geographical separation of the production process, this type of FDI will initiate trade through intra-firm trade in terms of exporting and importing intermediate goods from other parts of the firm (or from external suppliers).

In our example with the truck production, even if the assembly of trucks is moved to a plant abroad, this can generate increased exports from the home country of intermediate in-puts such as engines. If the firm can increase its sales due to production in the local market, increased exports of intermediate inputs from the home country can compensate for the loss of assembly.

Thus, the following observation states:

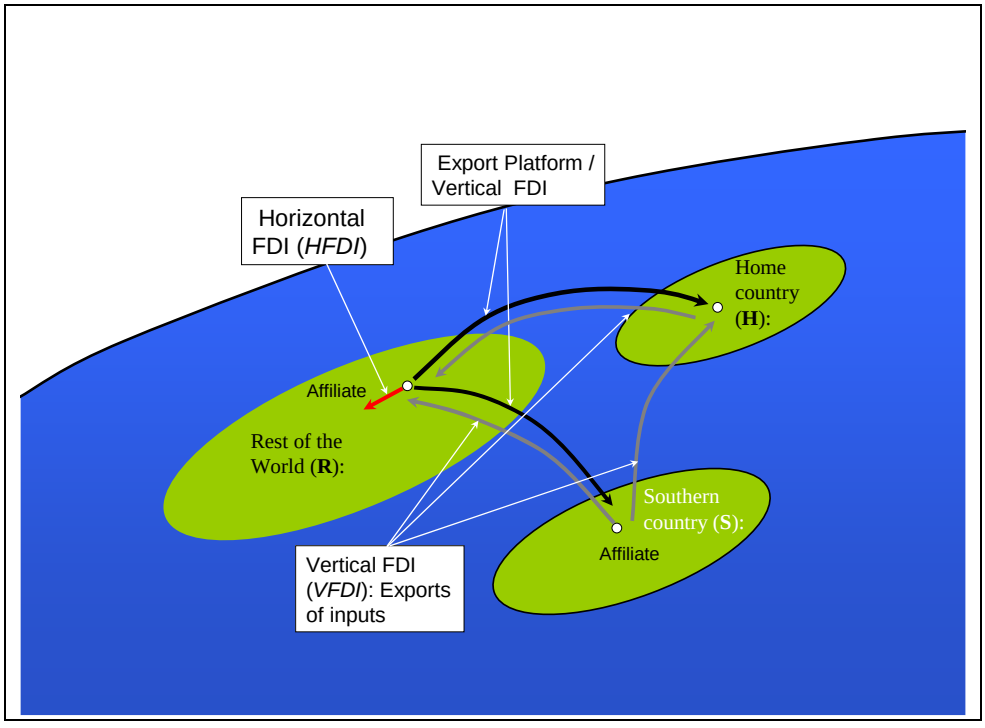
Observation 3: *Vertical FDI can be a complement to international trade by increasing intra-firm trade. For instance, locating the assembly of final products abroad may increase demand for and exports of intermediate inputs from the home country.*

2.3 Complex FDI

In order to highlight the mechanism behind different types of investments, we have discussed vertical and horizontal investments separately. While this is useful, investments may, in reality, be driven by both market access and factor cost motives simultaneously, and the two motives may interact.

For instance, suppose that a truck producer locates production of parts in the country S to take advantage of lower factor costs. With lower production costs for intermediate inputs, the cost of producing the truck decreases. But this implies that trade costs become relatively more important when serving the foreign market in country R, and the "vertical" investment in country S may then induce the truck producer to locate assembly in country R (Yeaple, 2003). This type of "vertical specialization", or complex strategy FDI, is illustrated in Figure 7.

Figure 7 International Expansion: Complex strategy FDI



The more complex investments have increased in importance in the last decades. Feinberg and Keane (2003) find for example that as much as 69 percent of US firms aim for more complex strategies. [7]

There are several plausible explanations for this:

- One explanation relates to the fact that several large developing countries, such as China and India, with abundant resources of less skilled labor as well as an increased market, have been integrated into the world economy. Eastern European countries have also integrated the with the Western European economies. NAFTA has made the Mexican labor force accessible to production for the North American market.
- Vertical fragmentation of production across countries has benefited from the liberalization of international trade and improved transport technologies and transport systems. This has decreased the costs of transporting final goods or intermediate goods between the different parts of the firm. Empirical studies also show that the share of intermediate inputs in world trade has increased (see Yeats, 1998, Hummels, 2007).[8]
- The significant impact and increasing presence of information and communications technology (ICT) in the global economy has enabled firms to become more effective in organizing production. Managing a complex production network such as the "Vertical Specialization Structure" is therefore feasible.

The primary effect of the new economic environment is that international production has grown significantly through an increasing number of foreign affiliates in the world. Firms have now more choices in how they may produce and deliver goods and services to foreign destinations, as they now can choose between (i) home country production for export (ii) foreign country production for local sale or (iii) foreign country production for third country export.

Moreover, firms can nowadays effortlessly acquire resources and inputs for production on foreign markets by importing them from foreign producers or by establishing vertical production facilities which grant them access to the resources, needed for producing products to sell on national, regional and or global markets.

---

[7] Hanson, Mataloni, and Slaughter (2005) and Braconier, Norbäck and Urban (2005a) provide some recent empirical evidence of cost driven Vertical FDI.

[8] Improved materials have for example increased the size of ships, shrinking variable cost of transport. Modern information technology has drastically increased the reliability of transport networks.

In the new environment, firms can utilize global opportunities, which strengthen their own competitive positions by increasingly organizing or reorganizing their foreign production activities, capitalizing on both tangible and intangible assets available within the MNE network.

As a result, the simple, sequential relationship characteristic of MNEs in manufacturing as was mentioned in the beginning of the chapter, gives way to a more complex relationship, where intra-firm activities become increasingly important. Thus, a firm's decision to expand encompasses a combination of both exports and FDI (both vertical and horizontal) in which both trade and FDI are determined simultaneously by variables such as firm and plant level economies of scale, trade costs, tariffs, market access, and differences in endowments.

2.4 Home country exports and FDI: substitutes or complements?

This section will briefly review empirical studies which have examined the relationship between FDI and exports from the home country.

The theory in the previous section provides the following predicted relationships:

- *Horizontal investments*, seeking to establish foreign production to secure better access to foreign markets, can *substitute* exports from the home country (Observations 1 and 2).
- *Vertical investments* seeking to exploit factor price differences between countries by dividing up the production chain promote intra-firm trade and can thereby *complement* home country exports (Observation 3).

Given the fact that FDI mostly flows between developed countries, it appears that FDI should be predominantly horizontal or market seeking in nature. Thus, it is expected from theory that FDI replaces home country exports (Observations 1 and 2). However, the evidence from the empirical literature is far from conclusive and the majority of the previous studies do in fact find a positive complementary relationship, where foreign direct investments promote home country exports, and vice versa.

Empirical economic research on whether foreign production complements or substitutes exports from the home country, can be categorized into four groups; country-, industry, firm- and product level studies. Below, a few of the important papers in this field will be highlighted.

Country-level studies

Grubert and Mutti (1991) find results in favor of a *positive* relationship when evaluating the relationship between FDI and trade. Based on bilateral trade data for over 30 countries they find that outward US FDI (where US firms invest overseas) promotes US exports and imports. Moreover, Clausing (2000) shows that *multinational activity and trade are complementary activities*, especially concerning intra-firm trade, when using two separate panel-data sets on foreign operations of US MNEs and on foreign MNEs in the US.

Some empirical findings further argue that the relationship is by nature dynamic and determined by various factors, such as time and economic growth. Studying variation among US firms, Bergsten et al. (1978) finds that an *initial complementary effect* between FDI and exports is turned into a *negative substitution effect* as the internationalization advances to a high degree and, hence, operations in host countries become more competitive (Observation 1). [9]

Industry level studies

Turning to industry level studies, Lipsey and Weiss (1981) also find a *positive relationship* between US exports and foreign affiliate production, when examining U.S. investments in foreign markets, using cross-section data, by industry, for 44 countries.

Brainard (1997) for the U.S. and Co (1997) for Japan also find evidence in favor of a *positive relationship*. Brainard (1997) examines the relationship between trade and FDI on the cross-section data in 63 industries and 27 countries. Sachs and Shatz (1994) estimate that a 10% increase in the share of intra-firm bilateral trade led to a 40% increase in trade with the country considered. Pfaffermayr (1996) concludes a similar pattern for Austria.

Lai and Zhu (2006) examine the relationship between U.S. exports and MNE production abroad in a setting where exports from the affiliates to third markets are incorporated in the analysis. In other words they include platform FDI in the analysis, which makes the study an interesting contribution to the studies in this field. See Figure 4 in Section 2. In the empirical analysis, they estimate exports and affiliate production independently, as a function of trade and production costs as well as other micro and macro variables, rather than estimating trade as a function of FDI (affiliate sales and/or production).

[9] Using firm-level data Pearce (1982) finds also that trade between affiliates in different host countries will gradually replace trade between the home country and affiliates.

An econometric problem faced in their study and all studies which examine the relationship between FDI and international trade is that exports and foreign production are to a large extent determined by the same variables.[10] To deal with this endogenity problem, estimations were made in a two-equation-system applying the Maximum Likelihood (ML) method and a Generalized Method of Moments (GMM) estimator.

Based on the structural estimates, Lai and Zhu simulate the effects of trade liberalization. We can illustrate this exercise in terms of the simple example with the truck producer in Section 2. Trade liberalization involves removing the trade barriers for exports from the home country H to country R (t_{HR} in Figure 4) and the trade barrier for exports from country F to country R (t_{FR} in Figure 4). Lai and Zhu conclude that trade liberalization has a positive effect on both US exports and foreign production. However, the effect is much stronger for the overseas production. In particular, they find that complete trade liberalization would increase US exports by 3 %, while the increase in FDI is much stronger at 23%. Thus, taking into account that trade liberalization makes the host country a better export platform to nearby markets, *trade liberalization may produce a substitution relationship between FDI and trade* (Observation 2).

Firm-level studies

Turning to firm level studies, most of them have been undertaken on US, Japanese and Swedish firms. Lipsey and Weiss (1984) and Lipsey et al. (1999) present results in favor of a *positive relationship* between trade and FDI, when examining U.S. and Japanese MNEs, respectively.

For example, Lipsey and Weiss (1984) find results arguing for a *complementary relationship* as the parent firm's exports increases to the country in which the affiliate production takes place. They argue that foreign production increases the total demand for a firm’s products of which some are exported from the home country. Foreign production may then advertise the firm’s full set of products, including products originating from the home country. Export sales from the home country can also reap the benefits of more efficient distribution and delivery created by direct investments.

Outward FDI can also increase home country exports, as foreign production may increase the demand for intermediate inputs produced in the home country (Observation 3). Examining the relationship for Sweden, based on the database set up by the Research Institute for Industrial Economics (RIIE), Swedenborg (1979, 1982) found that the additional exports of intermediate goods, and *complementary* supply of finished goods, outweighed the substitution effect on exports of finished goods.

[10] If the researcher finds a positive relationship between trade and FDI, given that an increase in some factor cannot be fully measured by the researcher, it would be incorrect to attribute the increase exports to the increase in FDI.

Head and Ries (2001) present similar results, using Japanese firm-level data, including 932 Japanese firms during a 25-year period.

Svensson (1996) re-investigates the pattern of trade and FDI for Swedish firms using the RIIE data and finds that the positive relationship between home country exports and foreign production was overturned and became negative for the Swedish Multinationals in the 1980s. An interesting feature in Svensson's analysis is that the switch from a positive to a negative relationship was not visible in the bilateral trade relations between the parent firm and the affiliates in the host countries, but emerged when consideration was given to replacement of home exports to other third markets by exports from affiliate production to those markets. His results thus provide some evidence that *Platform FDI may replace exports from the parent firm in the home country* (Observation 2).

Norbäck (2001) examines the role of R&D activities for the choice between exporting from Sweden and FDI, as measured by foreign production. Norbäck shows that high-tech firms, as measured by high R&D expenditures as a share of total sales, on the margin will choose exporting from Sweden rather than producing in an affiliate abroad. This result shows that while *foreign production can replace home exports,* this seems less likely for R&D intensive production.

Product-level studies

We have seen that market-access driven (horizontal) FDI tends to substitute home exports in final goods, whereas FDI driven by the motive of reducing production costs (vertical FDI) may serve to increase home country exports in intermediate goods. The diversity in results provided by different studies may be related to the fact that most empirical work is performed on highly aggregated data which might conceal substitution and complementary effects (Head and Ries, 2001).

Blonigen (2001) attempts to identify these effects by using highly disaggregated product-level data on exports from Japan. He finds substantial *evidence for the presence of both substitution and complementary relationships,* when decomposing the empirical findings on the basis of the foreign affiliate activity and the specific stage in the production.

Blonigen decomposes trade into processed/final products and input/intermediate products. From his detailed trade and FDI data on Japanese production in the US and Japanese exports to the US, Blonigen concludes that FDI in the US by Japanese MNEs increases Japanese exports of intermediate goods (Observation 3), but decreases Japanese exports of final goods (Observation 1).

Conclusion

Summing up, the relationship between FDI and home country exports is complex and the empirical findings do not deliver clear cut answers.

If we look at this relationship on an industry, national and global level, trade and FDI promote each other in the empirical literature, indicating that the trade-creating effect of FDI ends to outweigh the trade-replacing effect for the home country. However, in a single product or firm, FDI can substitute for trade. This state of affairs is partly responsible for the belief that trade and FDI are substitutes.

The discrepancies in the empirical literature are most likely due to two fundamental problems in identifying the relationship between FDI and trade.

- *First, theory tells us that FDI and exports may be driven by the same underlying factors*, such as market demand. Hence, the relation between FDI and trade depends on which underlying factors determine both of them. This fact, encompassing a new complex economic surrounding, is not often applied in the more recent research.
- *Second, theory also tells us that whether FDI and exports are substitutes or complements is closely related to the type of activity we examine.* FDI may increase the demand for intermediate inputs from the home country but reduces exports of final goods. To identify these different effects, the empirical analysis must be done with sufficiently disaggregated data, distinguishing final and intermediate goods within narrowly defined industries or product categories.

This study intends to address the two problems described above. But first we will present the outward activities in FDI depicted in the next chapter.

3 The Foreign Operations of Swedish Multinational firms

In order to empirically analyze the relationship between trade and investments, it is helpful to first review a few stylized facts and interesting trends concerning the operations of Swedish multinational enterprises. This section aims to do this using both aggregated data and micro firm level data.

3.1 Aggregate data

Similar to global patterns, Swedish firms have increased their investments abroad during the last decades. This can be seen in Figure 8, which presents the growth of Swedish outward FDI stocks, Swedish merchandise exports and Sweden's GDP between 1980 and 2005. As can be seen, the Swedish outward FDI outgrew both exports and income during the period. While the domestic production increased by a factor of 1.7 and exports increased by a factor of 3.3, the outward FDI stocks increased by a factor of 55, between 1980 and 2005. In other words, the FDI increased 55 times over its initial value from 1980 to 2005.

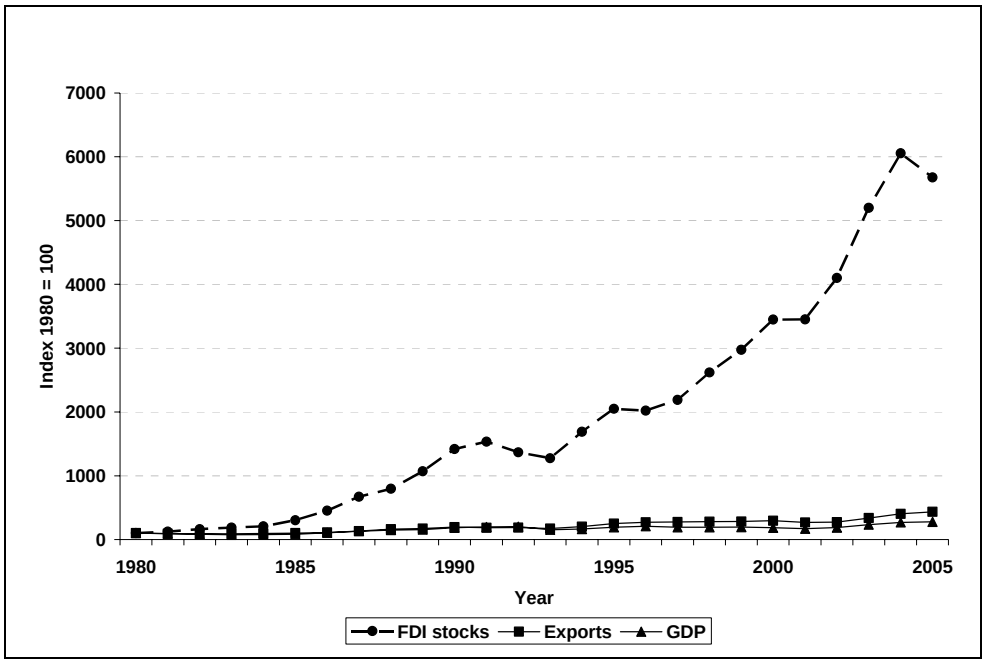
Figure 9 examines Swedish investments abroad in more detail. The stocks of FDI by Swedish MNEs are the filled bars corresponding to the left vertical axis and Swedish MNEs share of world outward FDI stocks is the line depicted on the right vertical axis. As can be seen, the Swedish outward FDI stocks have increased in magnitude from an initial value of 3.5 Billions USD in 1980 to almost 200 Billions USD in 2005. In addition, the Swedish world market share in outward FDI stocks has increased from 0.6 % to 1.9 % between 1980 and 2005 (right axis).[11]

In Figure 10, we compare the growth of the Swedish world market share in the world-wide stock of outward FDI with some other countries. As seen, Sweden has had a lower growth rate compared to Finland, but a higher or similar growth rate than Germany, the EU15 average, and Denmark.

The absolute values of the world market shares in outward FDI stocks for Sweden, Finland and Denmark can be seen in appendix.[12]

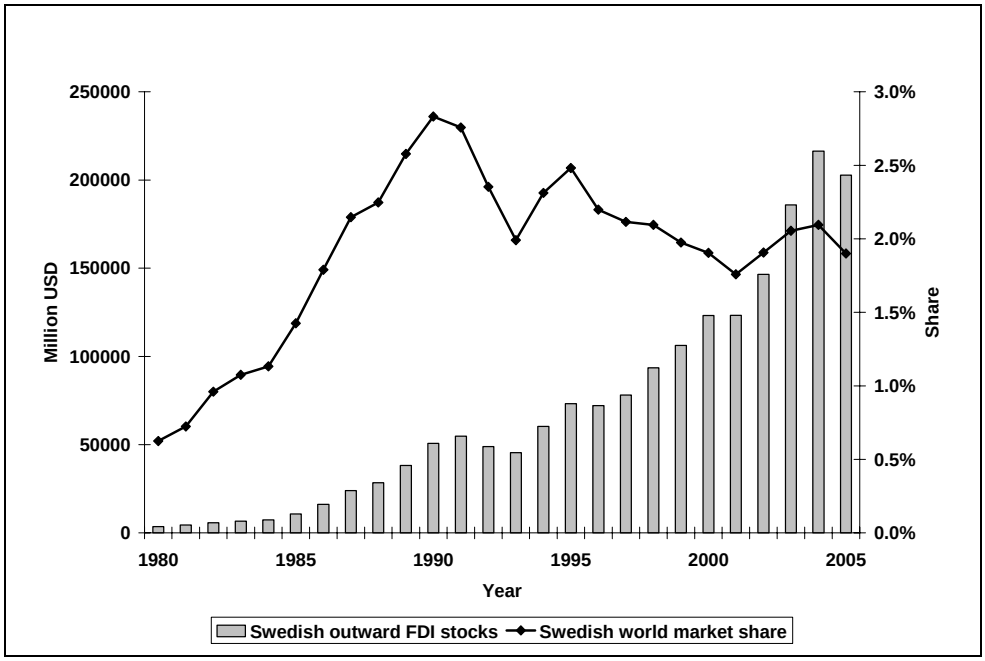
[11] As a comparison, the Swedish world market share in merchandise exports decreased by 23 percent during the same period, between 1980 and 2005.
[12] As can be seen the Swedish world market share in 2005 is approximately 2 times and 3 times the size of the Danish and Finnish world market share, respectively.

Figure 8 Swedish outward FDI stocks, Exports, and GDP, 1980-2005



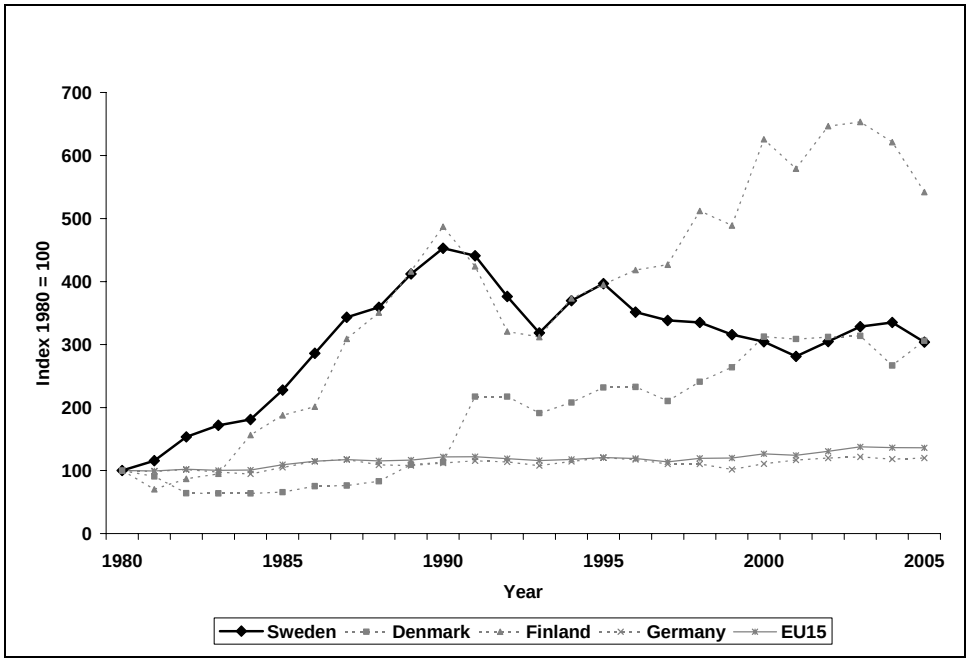
Source: UN Comtrade, UNCTAD, Statistics Sweden & own calculations, current prices
Note: Index numbers, 1980=100.

Figure 9 Swedish outward FDI stocks: Million USD and World Market Share



Source: UNCTAD & own calculations
Note: Current prices

Figure 10 Outward FDI stocks for Sweden and selected countries, as a World Market Share index



Source: UNCTAD & own calculations
Note: Current prices

Foreign acquisitions of Swedish MNEs in the 1990s

A noteworthy feature in Figure 9 (as well as in Figure 10 for Sweden) is the upward trend in the world market share of outward FDI of Sweden between 1980 and 1990, which is replaced by a downward trend between 1990 and 2005. One explanation for this reversal is the foreign acquisitions made by the Swedish multinational firms which started in the 1990s.

After the Second World War, governments in most developed economies, including Sweden, had a relatively large influence in the economy. At that time, the economy was heavily regulated and it comprised numerous state monopolies. However, as of the late 1970s and early 1980s the majority of the developed countries, including Sweden, started to shift their economic policy towards a more liberal policy stance. Sweden thus began liberalizing its economy and so the Swedish business sector was rapidly liberalized from the mid-1980 and onwards. The Swedish credit market became completely deregulated in 1986 and the Swedish capital market became fully deregulated in 1993, removing all restrictions on foreign ownership of Swedish firms and real estate (Henrekson and Jakobsson, 2003). Simultaneously, Sweden applied for EU membership in 1991 and joined as a full member in 1995. In addition, Sweden was forced to abandon its fixed exchange rate due to massive speculations against the Swedish currency in November 1992

These reforms and events initiated substantial inflow of foreign investments in the Swedish corporate sector. For example, ASEA became foreign owned in 1987, Alfa Laval in 1991, Autoliv in 1996, Astra in 1998, Saab Automobile AB in 1998, and Volvo Cars in 1999, etc. Between 1989 and 1999, the foreign ownership share of listed shares at the Stockholm Stock Exchange, increased from 7 % to 40 % (Sundin and Sundqvist, 2001).

This shift can be seen in the first section in Table 3 where the Swedish inward FDI stocks as a % of GDP, increased from the mid 1990 and onwards. In the beginning of the 1980s, the stocks of Swedish inward FDI as a percentage of GDP were in fact lower than the EU average. However, in 2005, Sweden had surpassed the EU average and the other benchmarking economies.

Thus, it is likely that the foreign ownership of large former Swedish MNEs, can explain some of the relative decrease in the Swedish outward FDI stocks seen in Figure 9. That is, former Swedish MNEs and their affiliates are no longer recorded as Swedish after a foreign takeover.

Table 3 Inward and outward FDI stocks, % of GDP

	Inward FDI stock % of GDP, 1980 - 2005						Outward FDI stocks % of GDP, 1980 - 2005					
Region/economy	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**
Sweden	2.2	4.1	5.3	12.5	39.2	47.8	2.8	10.3	21.1	29.5	51.4	56.5
Denmark	6.1	6.0	6.9	13.2	46.5	39.1	3.0	3.0	5.5	13.7	46.2	45.5
Finland	1.0	2.5	3.7	6.5	20.2	27.3	1.4	3.4	8.2	11.6	43.5	38.5
Germany	4.1	5.4	6.7	6.7	14.5	18.0	4.8	8.7	9.1	10.9	29.0	34.6
European Union	6.7	9.9	10.9	13.0	26.3	33.5	6.0	10.6	11.5	14.8	36.8	40.7
Developed econ	5.3	6.4	8.2	8.9	16.2	21.4	6.2	7.3	9.6	11.3	22.8	27.9
World	5.3	6.9	8.5	9.4	18.3	22.7	5.7	6.5	8.6	10.0	20.5	23.9

Source: UNCTAD

Interestingly, looking at Table 3, we can see that this did not affect the increase of Swedish outward FDI stocks, as a share of GDP. In the beginning of the 1980s, the stock of Swedish outward FDI as a percentage of GDP was 2.7 %, just above half of the average EU level of 5.7. By comparison, Denmark, Finland and Germany held shares of 3.0 %, 1.4 %, and 4.7 %, respectively. However, after 1985, Sweden surpassed the selected countries. In 2005 the Swedish outward FDI as a percentage of GDP was 56.7 %, compared to the EU average of 40.7. Denmark, Finland and Germany held shares of 45.6, 38.5 and 34.6 %, respectively.

The large outward activities in terms of the high level of Swedish outward FDI stocks, in comparison to other countries, may reflect several factors, such as a relatively early expansion of large Swedish firms in industries that generated the bulk of global FDI.

The historically large outward activities through FDI can also be seen by looking at the Swedish outward FDI stocks as a % of exports, seen in Appendix.

3.2 The RIIE survey

In order to analyze trade and investment patterns more closely, we will make use of "The Research Institute of Industrial Economics" (RIIE) database, which includes almost all Swedish MNEs in the manufacturing sector and is available for the years 1965, 1970, 1974, 1978, 1986, 1990, 1994, 1998 and 2003. The micro data contains detailed information on the Swedish MNEs and the producing foreign affiliates on variables such as employment, production, internal and external trade flows, and R&D.[13]

The survey

Table 4 describes the number of firms participating in the surveys, the number of producing affiliates and the number of employees abroad and the number of employees in foreign affiliates with production.

Table 4 Number of firms participating in the surveys

Year	Parents answering Questionnaire A	Affiliates answering Questionnaire A	Affiliates employees according to A**	Affiliates employees according to B***
1974	108	480	290.200	221.111
1978	122	567	309.030	227.149
1986	108	646	363.383	259.823
1990	120	871	654.167	440.879
1994	132	1378	370.257	531.994
1998	118	703*	424.850	223.061
2003	62	1.579*	456.619	404.268

Source: RIIE database
Note: * Includes observations from one MNE that reported data per country instead of affiliate. ** Total number of employees abroad as reported in A. *** Sum of reporting affiliates.

It can be noted that the number of participating firms decreased in the last surveys in 1998 and 2003. The fall in the number of participating firms can be traced to the foreign acquisitions of former Swedish MNEs and to a lower rate of response. While the rate of response was above 90 % in the surveys before 1990, it decreased to 77 % in 1998 and about 30 % in 2003. Due to the low rate of response in 2003, we will not use that survey year in the quantitative analysis in the next chapter.

[13] A more detailed description of the data, including Questionnaire A and B, is available in Braunerhjelm and Ekholm (1998).

Where do Swedish firms invest?

Let us now examine the geographical pattern of Swedish outward investments. Table 5 explores the geographical distribution of affiliate employment for Swedish MNEs during the time period between 1974 and 2003, listing the most important locations for affiliate employment. As can be seen, developed countries attract the bulk of investments, which suggests that Swedish investments abroad are predominantly horizontal in nature.

Table 5 Most important countries for affiliate employment (share in total employment abroad)

		1974	1978	1986	1990	1994	1998	2003
1	USA	6.0	9.2	19.1	20.4	22.3	22.1	22.1
2	Germany	15.3	13.5	10.7	16.8	12.1	13.3	8.5
3	France	13.0	10.3	6.9	4.8	5.6	6.0	8.5
4	Italy	8.1	6.9	11.6	9.3	11.0	10.0	6.1
5	United Kingdom	7.0	9.6	6.2	9.4	8.4	5.3	5.6
6	Brazil	9.0	10.6	5.8	3.9	4.0	4.8	4.0
7	Finland	3.7	3.4	2.9	2.4	1.3	2.2	3.0
8	Norway	1.6	1.5	2.3	3.4	2.2	1.0	2.8
9	Poland				0.1	0.9	1.7	2.8
10	Belgium	3.7	4.1	3.4	2.3	3.4	3.6	2.6
11	Spain	2.7	2.9	3.1	3.1	2.9	2.1	2.6
12	China					0.7	1.3	2.5
13	Czech Republic					0.6	0.3	2.5
14	Denmark	3.5	3.3	4.1	3.6	3.0	2.7	2.4
15	India	5.7	1.5	1.8	1.0	1.8	2.2	2.4
16	Australia	3.0	1.9	2.5	1.8	1.6	1.0	2.3
17	Netherlands	3.8	5.8	3.0	2.8	3.4	2.4	2.1
18	Canada	1.7	1.8	1.6	1.9	1.3	3.5	2.0
19	Mexico	2.1	2.0	2.6	1.8	1.5	2.1	2.0
20	Argentina	1.2	1.6	1.1	0.8	0.9	0.9	1.5
21	Hungary				0.1	1.9	1.4	1.1

Source: RIIE database

In 2003 about one out of five foreign workers in Swedish MNEs had their employment in an affiliate in the US. Other important locations for foreign employment were the large Western European countries: Germany, France, Italy and UK. The share of employment in the European countries has decreased over time whereas the importance of the US market has increased. These changes in employment shares are likely to be driven by the increasing importance of the US market.

For developing countries, Swedish firms have traditionally had significant investments in Latin America, in particular in Brazil, in response to import-substitution policies. Hence, in this case FDI was a substitute for export. In the 1990s, there is evidence of cost-driven (Vertical) FDI growing in importance and we note that affiliate employment is emerging in the Eastern European countries such as Estonia, Hungary, Poland and the Czech Republic. Swedish firms are also starting to locate investments in China and increase their traditionally large share in India.

The degree of internationalization in the production

In the previous chapter we presented evidence of an increasing presence of FDI and MNEs in the world economy, indicating that not only trade but also FDI and international production drive the economic integration forward. Since offshore production has become a key driver in terms of delivering goods and services to foreign markets, we will briefly go through how the growth in FDI has affected the degree of internationalization in the production networks. The degree of internationalization in the Swedish MNEs production can be illustrated in Figure 11, which depicts how much of the total firms' sales and their total employment, foreign operations account for.

Figure 11 Share of foreign affiliate sales out of total group sales by Swedish MNEs and share of employees in Swedish Mnfcs MNEs

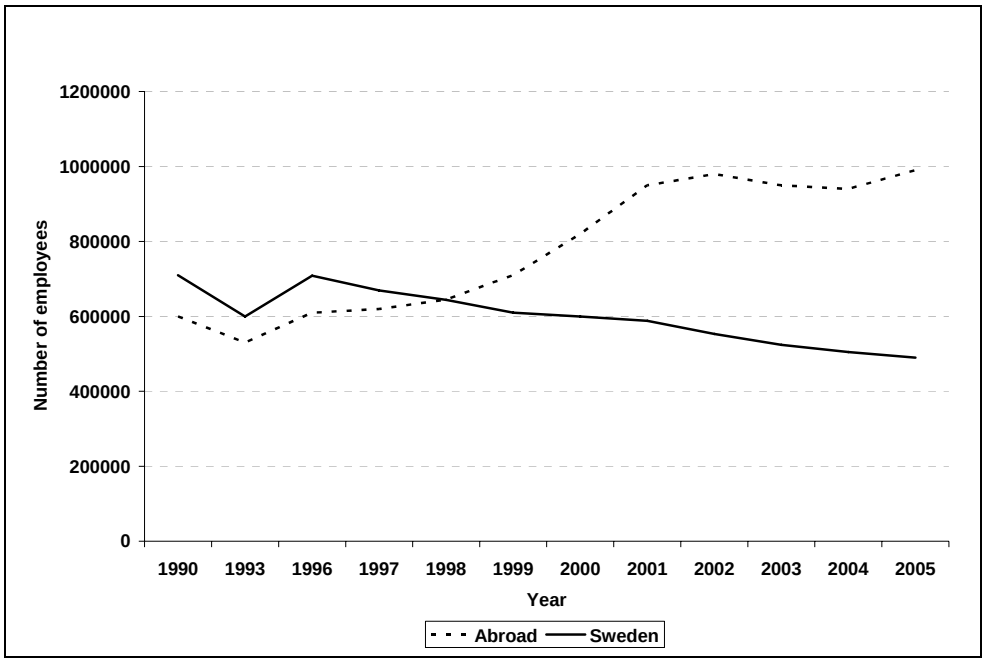
Source: RIIE dataset

The share of foreign affiliate sales out of the total firm sales has increased from 25 % to 65 % between 1965 and 2003. That is, approximately 2/3 of the sales can be allocated to sales by foreign affiliates, and the remaining 1/3 is produced and exported from Sweden or sold in the Swedish home market. The share of employees in Swedish MNEs stationed abroad displays a similar pattern.

These results indicate, among other things, an increased offshore activity in which, for example, employment has shifted from Sweden to foreign destinations. This may indicate that Sweden, as a location for employment and production of MNEs, has decreased in relative importance (Hakkala and Zimmerman, (2005)).

The RIIE dataset comprises only firms in the manufacturing sector. Nevertheless, including services does not change the general view, as is illustrated in Figure 12, which depicts the number of employees in Swedish owned MNEs with foreign activities for all sectors. As can be seen, approximately 55 % of the workforce was employed abroad in 1990 compared to 67% in 2005. Thus, the number of employees stationed abroad, in 2005 mimics the pattern of the MNEs in the manufacturing sector.

Figure 12 Number of employees in Swedish MNEs 1990-2005



Source: ITPS (2006)

A first look at the decreasing world market share in Swedish merchandise exports

Given the increased degree of internationalization in production, let us, out of curiosity, have a first look at the decreasing world market share in Swedish merchandise exports by looking at the trade and investment patterns running through the Swedish MNEs. By reviewing the Swedish firm exports to foreign destination, as well as foreign affiliate sales and foreign affiliate exports to the rest of the world, we will be able to capture the transformation, in relative terms, of how firms choose to deliver goods and services to costumers in foreign markets.

In Table 6 we present in Column (1) the Swedish aggregate exports, as a share of world exports; (2) Parent firm exports from Sweden, as a share of world exports; (3) Foreign affiliate exports from a foreign country to the rest of the world, as a share of world exports; (4) Foreign affiliate local sales, as a share of world exports.

As can be seen in Column (2), the parent firm exports as a share of to the total world exports has decreased from 1.4 % to 0.89 % between 1970 and 1999. This trend mirrors the downward trend for the aggregate Swedish world market share in merchandise exports, seen in Column (1), decreasing from 2.61 % to 1.53 %, during the same period.

Adding the foreign affiliate exports from a foreign country to the rest of the world into the picture, seen in Column (3), highlights the fact that Swedish MNEs have shifted or allocated activities, in terms of platform FDI, to foreign destinations.

Further, given the fact that the majority of the activities by Swedish firms are located abroad, we show in Column (4) the foreign affiliate local sales by Swedish MNEs as a share of the world export.[14] As can be seen, similar to the foreign affiliate 3rd exports, the foreign affiliate local sales have increased, going from a value of 0.67 % to 2.09 % between 1970 and 1998.

In sum, adding the foreign affiliate exports to the rest of the world and the foreign affiliate local sales to the parent firm exports from Sweden, indicate that Swedish MNEs have shifted the production and sales activities for export, in relative terms, from Sweden to foreign markets in which their affiliates are operating.

[14] World aggregate foreign affiliate local sales would be a better denominator. The current share can nevertheless highlight the shift in sales activities between Sweden and foreign destinations.

Table 6 Sales activities by Swedish MNEs

Year	Swedish exports, as a share of world exports	Swedish parent firm exports, as a share of world exports	Swedish foreign affiliate 3rd country exports, as a share of world exports	Swedish foreign affiliate local sales, as a share of world exports
	(1)	(2)	(3)	(4)
1970	2.61%	1.40%	0.18%	0.67%
1974	2.22%	1.10%	0.21%	0.49%
1978	1.75%	1.08%	0.26%	1.23%
1986	1.67%	1.07%	0.34%	2.24%
1990	1.71%	0.95%	0.66%	2.44%
1994	1.46%	0.81%	0.41%	2.02%
1998	1.53%	0.89%	0.30%	2.09%

Source: RIIE database

Home country interests and firm competitiveness

The above results highlight the question on whether outward FDI benefits the home economy, which is much dependent on whether outward FDI benefits and contributes to the overall performance of the remaining MNE activities in the sending home economy and whether the interests of the firm coincide with those of the home economy in a long term perspective. That is, even though there are economic gains from outward FDI as it allows MNEs to reap the benefits from production fragmentation, economies of scale, and global sourcing for knowledge, domestic policy makers may want to prevent a re-allocation of activities to foreign markets and a dispersion of the domestic production base (Chen and Lin, 2005).

However, the majority of research concludes that activities by MNEs on foreign markets do not substitute for domestic activities, in the long run. Further, research concludes that outward FDI positively raises the productivity growth and output in the home country which is beneficial for the home country competitiveness (Navaretti and Castellani, 2004).

In this context, it is vital to recognize that MNEs need to continuously restructure their entities in order to improve their competitiveness, through both market seeking FDI and efficiency seeking FDI. That is, in the context of an open market economy, improved competitiveness for the MNE is much needed to grow and adapt in the external environment and further achieve strategic objectives, such as expanding market access beyond their national borders, enhancing efficiency and acquiring strategic resources and assets in order to maximize profits.

4 The relationship between home country exports and foreign production within Swedish MNEs

In this section, we will use the RIIE data and examine the relationship between foreign production and home country exports for Swedish multinational firms.

In Table 5 we noted that Swedish MNEs predominantly invest, in terms of employment, in other developed countries such as the EU and the US. Thus, investments by Swedish firms can be seen to be predominantly market-seeking.

With investments by Swedish firms explained from the horizontal FDI model, Observations 1 and 2 suggest that foreign production and exports from Sweden of final goods should be substitutes. What type of pattern describing the relationship between foreign production through FDI and exports from Sweden should we then expect to find?

One way to look at this question is to examine how the Swedish MNEs have responded to the globalization process, which is in line with the current theoretical and empirical literature in this field.

If we define globalization as a growing world economy which is becoming increasingly integrated due to the liberalization of trade and improvements in transport- and communications technologies, the theory in Section 2, gives the following predictions:

Prediction 1: ***Lower trade costs should promote exports from Sweden****; when Swedish goods can be shipped to foreign markets at lower trade costs there is less incentive to take on additional fixed cost to set up new overseas plants.*

Prediction 2: ***Growing markets should attract market-seeking horizontal FDI;*** *since sales are higher in larger markets, the potential savings on trade costs through local production are more significant in large and growing markets.*

Prediction 3: ***Growing markets and decreasing trade costs simultaneously benefit platform FDI****; since countries located in proximity to important export destination markets may be increasingly used as platforms for affiliate exports.*

How can we then measure the effect of globalization on a firm's choice between foreign production and exports?

One option would be to study the aggregate data given in the previous section. However, these measures are likely to be driven by the behavior of the largest firms. In particular, the effect of the foreign acquisitions of the large Swedish MNEs, discussed in the previous section, will then have a strong effect on the aggregate pattern.

To control the differences between firms and to at least to some extent the changes in the sample, this study will instead examine the pattern of FDI and home country exports within firms. It will then be convenient to distinguish between what is called the *extensive margin and the intensive margin of FDI.*

Examining the extensive margin of FDI, we will look at measures of a firm's decision to invest, i.e. the choice between either to sell to a market through exports from Sweden, or to establish an affiliate to produce locally. Examining the intensive margin of FDI, we will examine the pattern of exports and foreign production, given that a firm has established local production in a country.

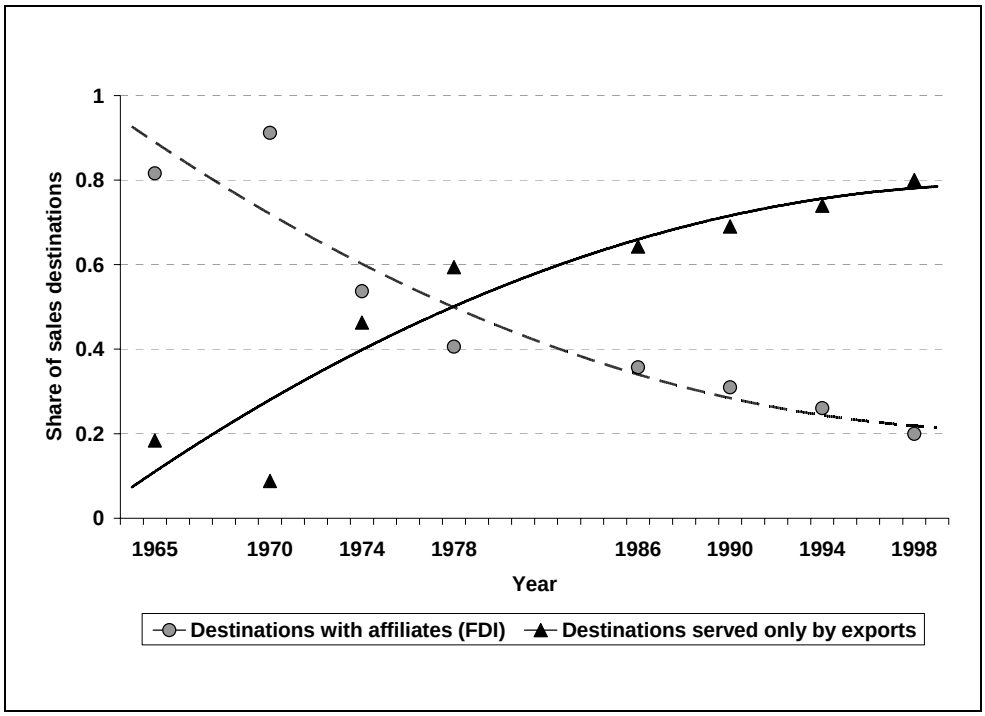
A measure of the extensive margin of FDI

Let us start with the discrete decision of whether to sell to a market by exports or to produce and sell locally in an affiliate. For each firm, we examine the destination countries of a firm's foreign sales, and then calculate the proportion of markets served purely through exports from Sweden (and which contain no affiliates). We can think of this a measure as an "Export propensity" for the firm. We then calculate the average share of destination markets served purely by exports over all firms in the RIIE data for each survey year.

The average share of destination markets served purely by exports is given in Figure 13. This figure shows that within the RIIE sample the propensity to export from Sweden is increasing over time, and hence the propensity to invest abroad is decreasing over time.

As we will document in the next section, there has been a substantial fall in trade costs during the last decades. As suggested by Prediction 1 above, lower trade costs may then be able to explain the increase in the propensity to export and the subsequent decline in the propensity to invest abroad.

Figure 13 The average propensity for FDI and Exports



Source: RIIE database

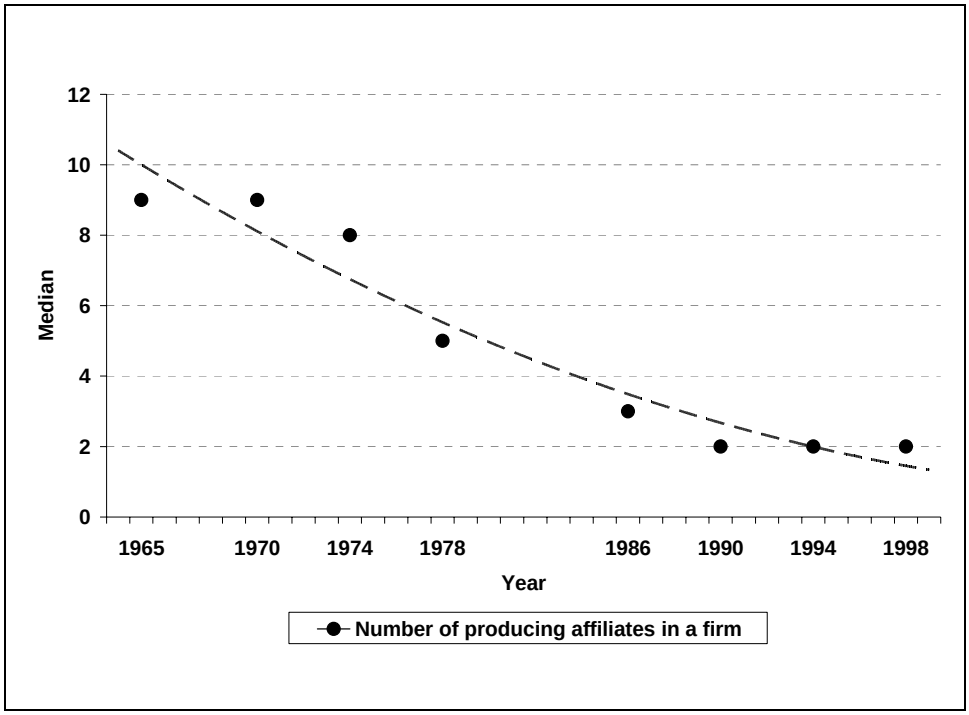
We should, however, be careful in stating that the increased export propensity is caused by falling trade cost:

- The RIIE sample consists of Swedish firms with at least one producing affiliate abroad. In other words, we are dealing with a sample of multinational firms as there are no pure exporting firms included in the data. The information on exports from Sweden is also given for a sub set of countries, mostly the largest countries, except for in the 1998 survey, which has a more extensive coverage of countries. For about 10% of the export observations in the data only the destination region are reported.
- Inspecting the data, there also seems to be a change in the composition of the sample over the survey years. This can be seen in Figure 14, where the median number of producing affiliates operated by firms in the sample has decreased from about 8 in 1985 to below 2 in 1998. Thus, an alternative explanation to the increased export propensity (and hence the decreased FDI propensity) may then be that the globalization process with market growth and trade liberalization has allowed smaller firms, with a smaller number of producing affiliates, to expand abroad through investments.

Such a pattern is also consistent with the recent theory of FDI with heterogeneous firms (see Helpman, Melitz and Yeaple, (2005)), which shows that smaller firms with lower productivity tend to not invest abroad since the trade cost reductions, from limited sale in sales, are not sufficient to cover the extra fixed costs of investing.

In a growing world with liberalized markets, also less productive firms can expand through FDI. But less productive firms will (in relative terms) tend to have fewer locations with affiliates, as compared to the larger, more productive, firms. We discuss a model of FDI with heterogeneous firms in the next section.

Figure 14 The median number of producing affiliates in a firm



Source: RIIE database

Summing up, we find an increasing share of destination markets purely served by exports from Sweden. This is consistent with the globalization process where trade costs are reduced.

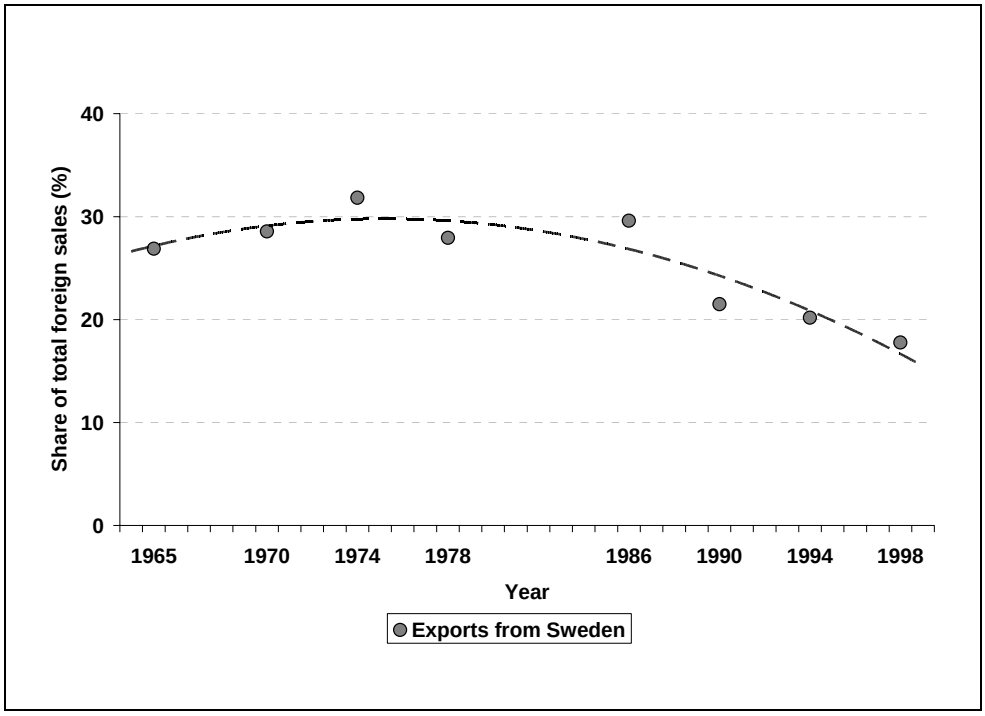
The intensive margin of FDI

Let us now examine a firm's decision of how much to produce locally and how much to export from Sweden, given that the firm has already established foreign production. This is a measure of the intensive margin of FDI.

To proceed, we calculate the firms' average exports to a host country, as a share of the firms' total sales in, and from, a host country. To obtain this we add each firm's invoiced sales from export to the total sales of its affiliates producing in the host country (including foreign affiliate third country exports to the rest of the world). We then calculate the average over all firms for each survey in Table 4 and label this measure the (average) export intensity from Sweden.

The (average) export intensity from Sweden is shown in Figure 15 with the circles. In the figure, we have also fitted a curve to show the evolution over time. By decomposing the revenues as average shares over all MNEs and countries, the results are less sensitive to various drops of firms in the sample, which implies that we omit some of the sample problems we face when dealing with aggregated data.

Figure 15 The average share of total foreign sales which is exported from Sweden



Source: RIIE database

Note that the export intensity from Sweden has a slight inversely U-shaped time pattern, with exports from Sweden expanding more than foreign sales from affiliates in 1970s. However, from the mid 1980s, the share of foreign sales by affiliates expanded more than exports from Sweden, and we see that the export intensity from Sweden falls.

In 1965, on average, about 25% of the foreign sales of a Swedish MNE were delivered as exports from Sweden. In the 1970s, there was a peak at

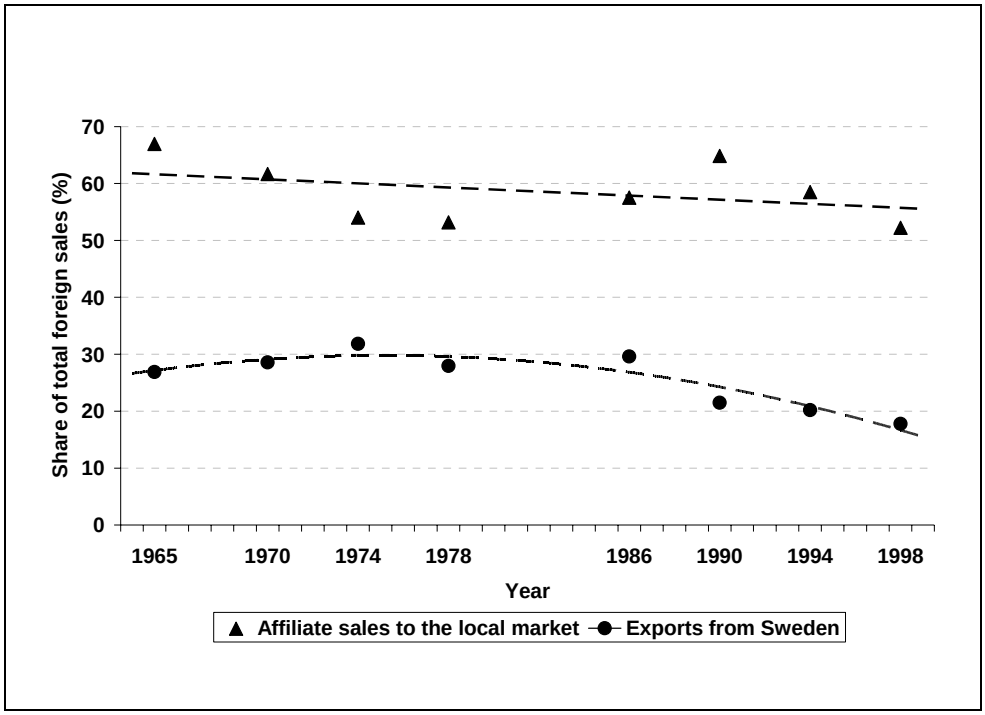
roughly 30%. In the 1990s, the average share of sales abroad exported from Sweden reached its lowest level, below 20 %.

Let us now try to relate this time pattern to the theory. The fact that the export share within Swedish MNEs increased in the 1970s, suggests that the effect of reductions in trade costs dominated the advantage of producing locally in this period. This is also consistent with the evolution of the average share of sales destination purely served by exports, illustrated in Figure 13.

But why did then the export intensity decrease in the 1990s? The theory suggests two channels in terms of Predictions 1 and 2. Prediction 2 would suggest that the decrease in the export share can be explained by world income increasing more than trade costs are reduced, leading to horizontal trade-cost jumping investments.

To measure the extent of horizontal FDI aiming at supplying the local demand in the host country, we examine the average share of a firm's total foreign sales, sold by foreign affiliates to the local market. Inspecting Figure 16, we observe that a decline in the share of exports from Sweden is by and large mirrored by an increase in the share of sales supplied by affiliates.

Figure 16 The average share of total foreign sales sold by affiliates to the local market

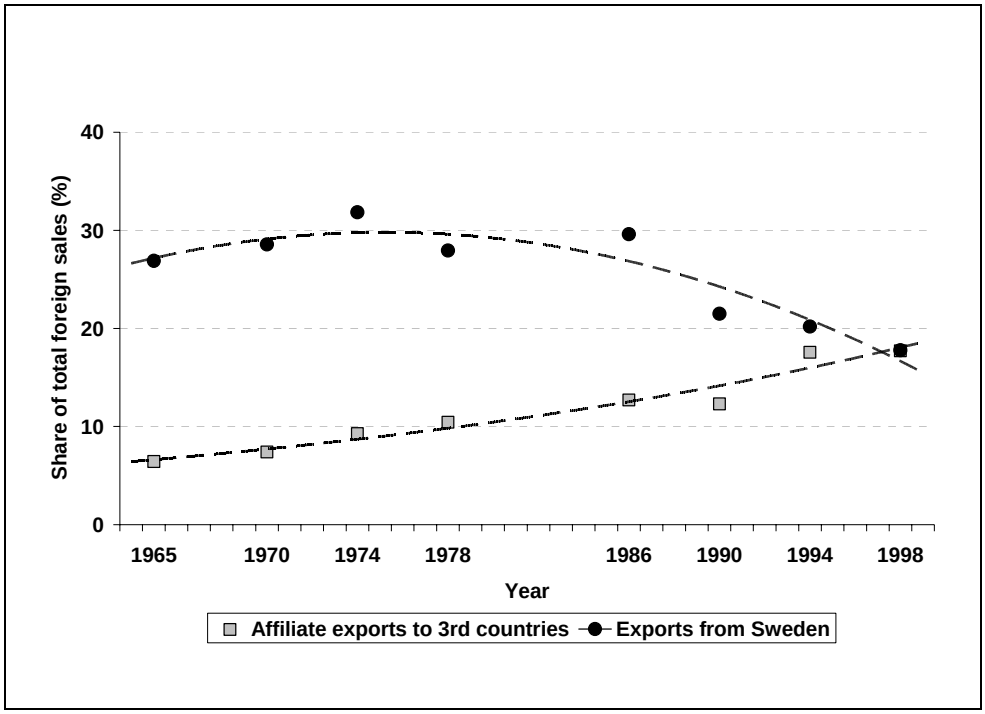


Source: RIIE database

Inspecting Figure 15 and Figure 16 more closely, however, we see a decline in the share of exports from Sweden, as well as the share of sales supplied by affiliates to the local market in the 1990s. This implies that some other source of affiliate sales must be increasing in importance.

We therefore turn to investigate affiliate exports. Prediction 3 suggests that globalization in terms of reductions in trade costs and growth of the world economy will promote Platform FDI. To examine this in more detail, Figure 17 displays affiliate export intensity defined as the average share of total sales in a host country which is exported to other countries than Sweden.

Figure 17 The average share of total foreign sales which is exported to third countries (RoW)



Source: RIIE database

As expected, Figure 17 displays a clear pattern of an increasing export intensity of affiliates. This suggests that Swedish firms are increasingly using affiliates in countries located in proximity to important export destination markets as export-platforms.

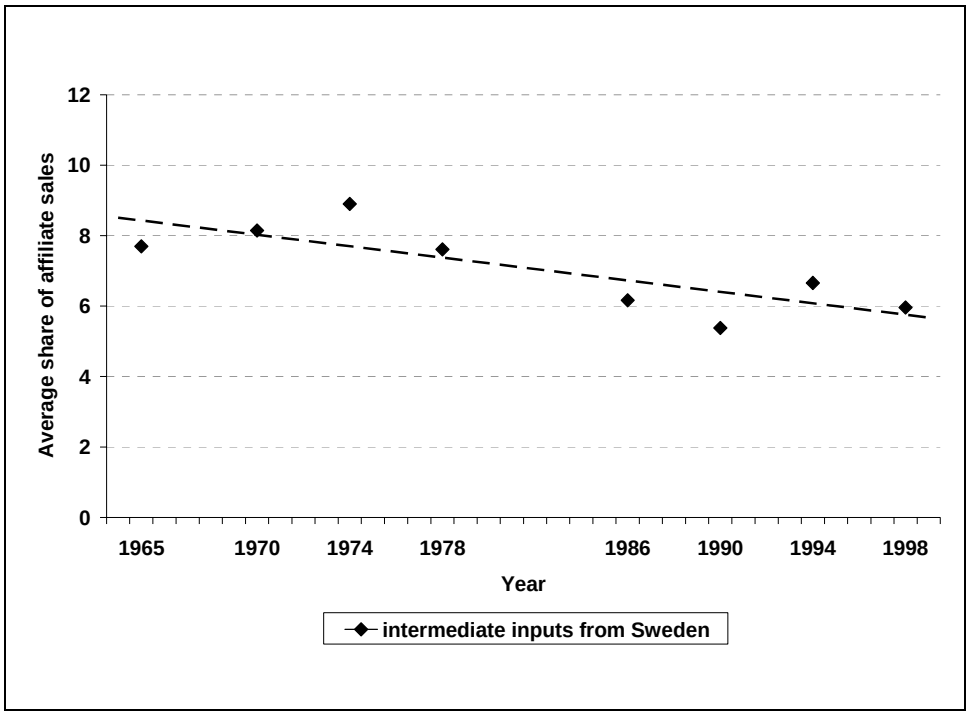
Vertical FDI

Let us end this section and investigate sales measures related to vertical FDI.

Ideally, data on all sales flows within a production network, as shown in Figure 7, would be available. Such data is rare and the RIIE is no exception. Only two measures are available which can proxy for vertical FDI. First, we examine exports of intermediate inputs from Sweden. We then examine imports back to Sweden, which is a simple measure of vertical FDI.

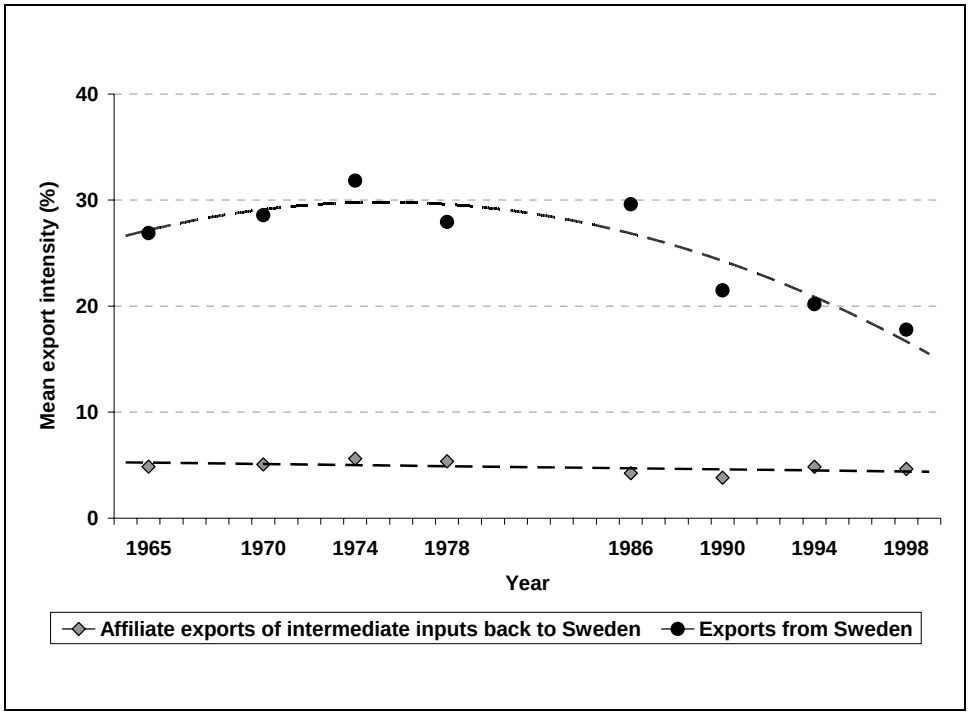
Figure 18 investigates the average size of exports of intermediate inputs measured as a share of affiliate sales. As shown, there is a decreasing trend, which implies that exports of intermediate inputs seem not to have kept up with foreign expansion in terms of affiliate sales. Affiliate sales back to Sweden show a similar trend, seen in Figure 19, albeit with an increase in the 1990s.

Figure 18 The average exports of intermediate inputs as a share of affiliate sales



Source: RIIE database

Figure 19 The average affiliate exports of intermediate inputs back to Sweden as a share of affiliate exports



Source: RIIE database

So what have we learned so far? Based on previous findings and the pictures depicted above, a firm's decision to expand involves a combination of both exports and FDI in which the two modes are determined simultaneously by a set of common variables. This implies that the relationship between home country exports and FDI goes through the common determinants.

In this context, Swedish multinational firms have allocated increasingly more activities to foreign destinations, which can be seen in the previous figures. The previous figures especially highlight the increased importance of the third country effect in terms of foreign affiliate exports to the rest of the world, as this mode stands for an increasing part of the total sales revenues for a given MNE in a given country.

Relating these figures to theory, it can be argued that this is a casual effect due to the growth of the world economy and the reduction in trade costs. That is, it could be the case that as the world economy grows and the trade costs are being lowered, firms may opt to supply foreign markets through FDI instead of exports – in relative terms – since it may be more profitable to do so. In order to shed light and validate this effect, an econometric analysis is needed, in which we can examine and isolate the effects coming from the growth of the world economy and the reduction in trade costs. This is the purpose of the next chapter.

5 Econometric analysis

In this section, an econometric model is estimated in order to examine the relationship between exports from Sweden and FDI in terms of foreign production.

More specifically, we use the results from the econometric model in order to quantify how the globalization, in terms of reductions in trade costs and a growing world economy, is related to the development of the Swedish merchandise exports within Swedish multinational firms.

This section is somewhat technical compared to the previous sections. This is however necessary in order to properly examine the relationship between exports from Sweden and FDI. A non-technical summary can be found in the end of this section and in the conclusions.

5.1 Econometric model

The estimation equations are derived from a three-country model of FDI with heterogeneous firms, built on Norbäck, Urban and Westerberg (2007). This model is described in Appendix 9.2 and illustrated in Figure 20.

In the model, there is a set of firms originating from country H, Sweden in our case. Firms have an initial capacity in H which is served from a pre-existing home plant.

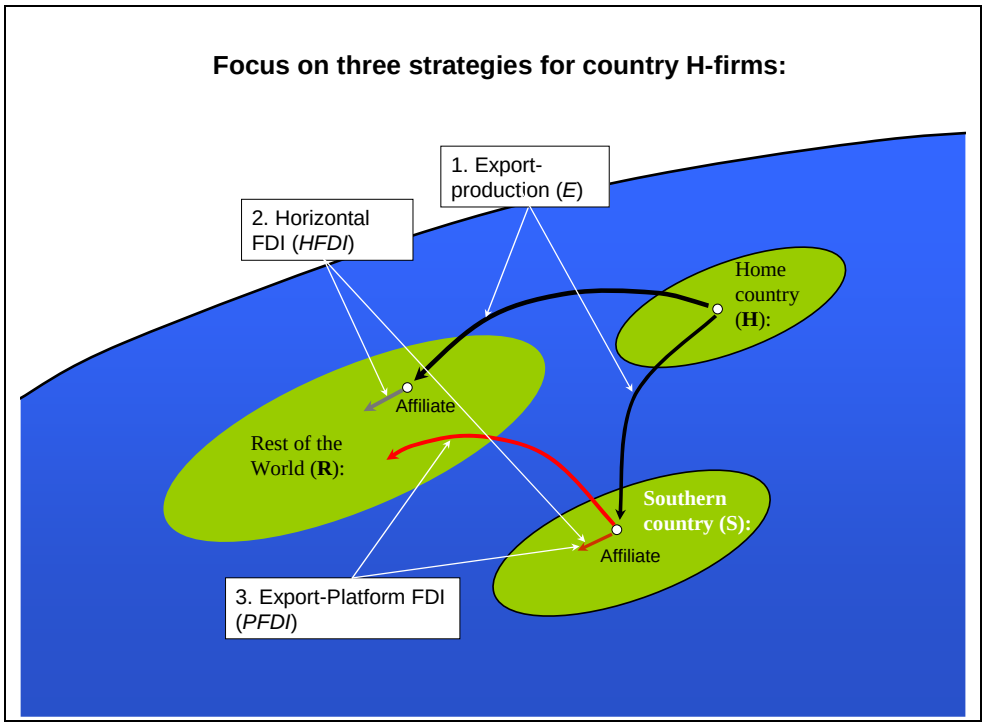
For international expansion, firms can choose between three strategies:

- *Export production* where production from the home country H serves countries R and F through exports,
- *Horizontal FDI* where a firm invests in plants in countries R and F which serve these countries locally,
- *Platform FDI* where countries R and F are served from country F.

In foreign production the parent also has to supply the foreign affiliates with intermediate inputs.

The theory provides estimation equations both for a firm's decision to invest in an affiliate/plant (the extensive margin of FDI) as well as for the level of sales in terms of exports from the home country, affiliate production for sale in the local market, and affiliate exports from the host country to the rest of the world (the intensive margin of FDI).

Figure 20 A three-country model of FDI



The RIIE data contain information on the industries in which affiliates abroad are active. However, for the exports from Sweden, the industries in which the firm is active are only reported for the firm as an aggregate. Thus, while we know how much each firm exports to the different countries, we unfortunately do not know the product composition per destination country. As a consequence, we cannot with precision estimate firms' decisions to invest, (the extensive margin of FDI). In the following, we will only estimate the equations representing the intensive margin, i.e. sales flows.

Econometric framework

The three strategies to expand internationally are depicted below in an econometric framework.

Export of final goods from Sweden:

Exports of final goods from Sweden can be explained by the following regression model:

$$Swedish\_exp_{ijkt} = \alpha_0 + \underset{(-)}{\alpha_1} trade\_cost_{kjt} + \underset{(+)}{\alpha_2} gdp_{jt} + \chi' X + \varepsilon_{ijkt}$$

$Swedish\_exp_{ijkt}$ is the export from Sweden of firm *i* to country *j* of a product in industry *k* at time *t*. The industry classification is the one at the 3 digit ISIC-level, corresponding to 28 manufacturing industries. The variable $trade\_cost_{kjt}$ is the measure of estimated trade cost to country *j* of a product in industry *k* at time *t*. This variable is discussed below and in the appendix. The variable gdp_{jt} is the measure of the market size in country *j* at time *t*. From the underlying model it is predicted that, while increased trade cost should decrease exports from Sweden (indicated with a (-) below the regression coefficient), increased host country market size should increase exports from Sweden (indicated with a (+) below the regression coefficient).

The vector *X* includes a number of control variables at the affiliate level, firm level, industry level, and country level. From the theory presented in the appendix, we control for size of the host country, if the host country is a member of a trade region and distance between Sweden and destination country and the size of the Swedish parent firm (reflecting heterogeneity between firms). In addition, we also control for R&D expenditure of the parent company, whether the parent has previous experience of local production in a host country, and GDP per capita to control for factor price differences. A detailed list is given in the Appendix. All variables except dummy (binary) variables are measured in logarithms.

Note that even if distance and dummy variables on RTA membership are comprised in the estimated trade cost index, we also include them into the current export and future platform FDI regressions. This is done in order to control for additional variation, not related to pure trade costs. Excluding these variables in the vector *X* in the export and FDI regressions do however not change the main findings, i.e. it does not change the point estimates of the remaining variables. This is also true for the platform FDI regressions.

Horizontal FDI

Horizontal FDI can be explained by the following regression model:

$$local\_sales_{ijkt} = \alpha_0 + \underset{(+)}{\alpha_1}\, gdp_{jt} + \chi' X + \varepsilon_{ijkt}$$

As a measure of horizontal FDI, we use the sales by an affiliate *i* directed towards the local market in country *j* of a product in industry *k* at time *t*.[15] Note that the trade cost variable is not included into the regression since once a firm produces locally in a host country, trade costs should not matter significantly. Thus, the main variable of interest here is the size of the local market as measured by host country GDP.

[15] The use of foreign affiliate local sales as a proxy for Horizontal FDI is common in the literature (see for instance Ekholm, Forslid and Markusen (2005)).

Similar to the export regression model, the vector *X* includes a number of control variables at the affiliate-, firm-, industry-, and country level, such as, whether the parent firm has a previous experience of local production in a host country, the size of the Swedish parent firm, host country GDP per capita, if the host country is a member of a trade region and the distance between Sweden and host country. A detailed list is given in the appendix. All variables except dummy (binary) variables are measured in logarithms.

Platform FDI

Platform FDI can be explained by the following regression model:

$$Affiliate\_exports_{ijkt} = \alpha_0 + \alpha_1 trade\_cost\_neighbour_{kjt} + \alpha_2 Market\_potential_{jt} + \chi' X + \varepsilon_{ijkt}$$

As a measurement of platform FDI, we use the exports of an affiliate *i* to destination countries other than Sweden from country *j* of a product in industry *h* at time *t*.[16] In this regression model, we include the estimated trade cost to the host countries trading partners, labeled *trade_cost_neighbour*. Since we do not know exactly to which countries such affiliate sales are directed, we take an average over all bilateral trade cost measures from a host country to its trading partners, but assign a weight proportional to its distance.

To obtain a demand measure related to the third country effects, we follow Hanson (1998) and use a distance weighted average of the GDP of the countries which import goods from the host country, which is labeled *Market_potential*.

Similar to the previous regressions, the vector *X* includes a number of control variables at the affiliate-, firm-, industry-, and country level. A detailed list is given in the appendix. All variables except dummy (binary) variables are measured in logarithms.

Estimating trade costs

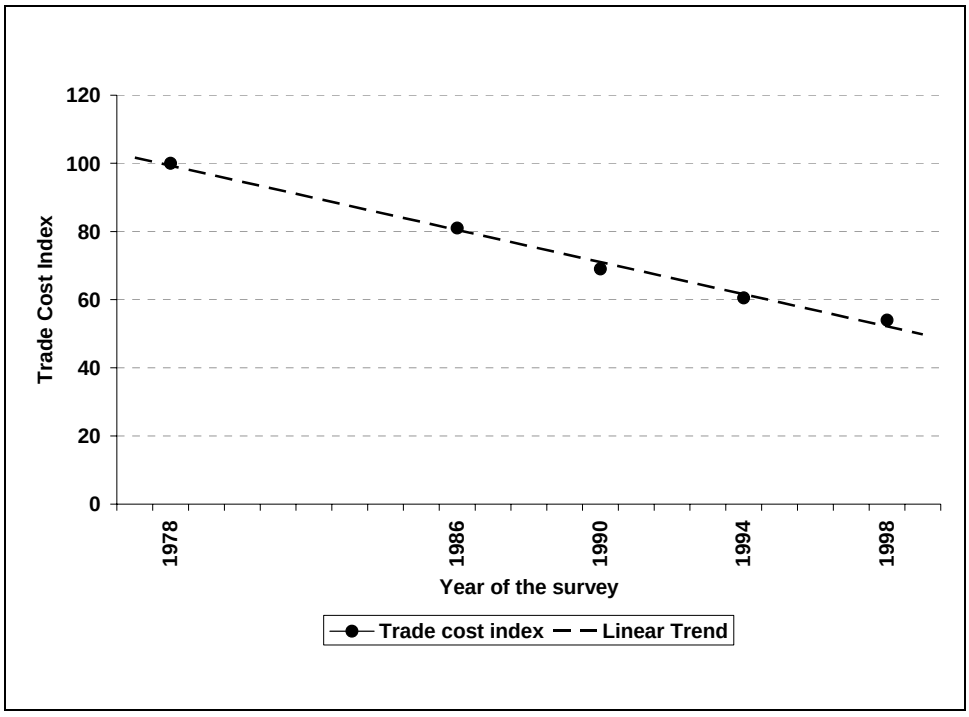
To estimate the econometric models, we need information on market size, trade costs and firm characteristics. Market size can easily be measured from GDP data. There is abundant information on firm characteristics in the RIIE data. Trade costs are however more challenging to obtain data on, in particular given the long time period for which the RIIE data is available. Ideally, it would be useful to have bilateral data on applied tariff rates over all products, countries and during the period between 1965 and 1998. However such data does not exist.

[16] This measure of Platform FDI is also common in the literature (see for instance Ekholm, Forslid and Markusen (2005)).

To obtain data on trade costs, we therefore estimate a so-called gravity regression at the industry level for each survey year using annual data from Nicita and Olarreaga (2006) on bilateral imports by 28 manufacturing industries of up to 158 countries over the period between 1978 and 2000. From the estimates of the gravity regression, we take the score, i.e., the predicted values, over distance, common border and common language, other geography variables such as whether a country is an island or landlocked, and dummies on common regional trade agreements among trading partners. This variable can be used as a proxy for the trade cost of a country, varying over industries and years. In the appendix we present a technical discussion of the construction of this variable and its meaning.[17]

To demonstrate this new measure of predicted trade cost, Figure 21 depicts the average trade cost in index numbers over all industries facing Swedish exports abroad for each year of the survey.

Figure 21 The average trade cost measure, faced by Swedish exporters



Source: Bilateral industry trade data from the World Bank and own calculations
Note: Index numbers 1978 = 100

[17] The change in the score over time expresses how much additional trade is generated in terms of a growth rate by reducing existing trade costs or destroyed by imposing additional trade costs. Note that a few of these variables do not change over time. Their impact on the bilateral trade does however change over time.

Figure 21 shows that the trade costs have decreased continuously over time.[18] In the regressions, the estimated trade costs are matched with the industry in which the firm is active. We can thus obtain empirical measures of the trade barriers which host countries raise against Swedish exports (t_{HR} in Figure 4), at the same time as we get an empirical measure of the trade barriers affiliate exports to third countries face (t_{SR} in Figure 4). When we use the information on trade cost in the exports from Sweden estimations, we assume that Swedish exports to each host country have the same product composition as the parent firm production structure.

The econometric framework is set. In the next section, we present the regression results.

5.2 Regression results

The regression results can be seen in Table 7 to Table 10 in section 8, under **Regression tables**. Each table consists of four estimation specifications, where each specification employs a different set of fixed effects. Specification (1) uses year fixed effects, (2) employs year and industry fixed effects formed by the ISIC2/3 classification, (3) applies year, industry and firm-specific effects, whereas (4) includes year and industry fixed effects drawing from the more detailed SNI92 classification. Note that ideally the simultaneity in the firms' location choice should be addressed, by applying the maximum likelihood (ML) method or a generalized method of moments (GMM) estimator. Our fixed effect estimation results are, however, reasonable and correspond well to the literature which tries to address the endogenity issue (see Lai and Zhu (2005)).

Table 7 shows the results from the regressions on the exports from Sweden. As expected a larger size of the host country market, measured by *GDP*, increases exports from Sweden, all else equal. The point estimates of the GDP variable vary around 0.5 and are statistically significant. As expected, lower *trade cost* increases exports from Sweden. Larger firms (*size*) and more *R&D* intensive firms have significantly higher exports which is consistent with new theories emphasizing heterogeneity among firms. In addition, more exports go to countries with larger *GDP per capita*, reflecting that the bulk of international trade is among industrialized countries.[19]

[18] Inspecting the causes of the reduction in trade costs shows that the trade cost per unit of distance decreased, but the increasing number of trade agreements also contributed to the trend.

[19] As mentioned earlier we include distance and host country membership in a RTA in order to control for non-trade-cost related variation, specific for Swedish MNEs, since these variables are already regressors in the trade cost index. Excluding these variables do not however change the results.

InTable 8, we examine the results on affiliate local sales, which is a proxy for horizontal FDI. As expected, we see that the size of the local market as measured through host country *GDP* significantly increases local sales. The point estimates of the GDP variable vary around 0.35 and are statistically significant. Increasing the *age* of affiliates implies significantly larger sales to the local market which may indicate that it can take time to integrate affiliates to the firm's production network. While larger firms (*size*) and more *R&D* intensive firms do sell more to the local market, the estimated coefficients are smaller than the corresponding estimated coefficients in the export regression in Table 7. This may indicate that these variables have a smaller impact on the local sales than on exports from Sweden which may result in that products which are based on advanced technologies are exported from Sweden. This contradicts recent theories on FDI with heterogeneous firms from which we would expect the opposite result, but may reflect that the transfer of technology may be costly, as suggested in Norbäck (2001).

We now turn to our measure of platform FDI, as measured by affiliate exports to destinations other than Sweden. A number of interesting results arise, seen in Table 9. As expected, affiliate exports increase when the demand from neighboring countries increases. The point estimates show that a 1 % percent increase in the *market potential* variable increases affiliate exports by roughly 0.5 to 0.8%. This estimated effect appears to be even stronger than the sensitivity of home country exports to the host country market size in Table 7.[20] Older affiliates (*age*) have higher affiliate export sales, which again may reflect that integration into the firm's production network may increase over time. Affiliate exports to third countries also increase when the *trade cost* of neighboring countries decreases. This corresponds well with theory which suggest that the firm can save on trade costs incurred in exports from Sweden by locating production in countries which are nearer to the final destination market (and potentially also have other cost advantages).

Let us finally examine the results on exports of intermediate inputs from Sweden, which can be seen as a proxy for vertical FDI. The results can be seen in Table 10. Interestingly, affiliates in larger host countries (*GDP*) import significantly more intermediate inputs from Sweden. A likely reason is that production for local sales is higher in large markets, as documented in Table 8.[21] A noteworthy finding is also that higher *R&D* intensity of the mother firm in most specifications will increase affiliate imports in intermediates. Again, this may indicate a pattern where the parent keeps production with advanced technologies in Sweden.

[20] This result provides a first indication about the relationship in favor for Platform FDI. We do however need to compute the numerical importance of this effect. This is addressed in the following section.

[21] Another reason is that large markets are often seen as regional hubs.

Summing up the results from the regressions, we identify two main engines that have driven Swedish parent exports and affiliate activities between 1978 and 1998; first the *growth of the world economy* measured in terms of host country *GDP* and the *market potential*, and second the *fall in trade costs* both between Sweden and export countries but also among host countries and third markets. According to our estimates and in line with theory, the rise of world income affects both parent exports and foreign affiliate sales positively. The fall in trade cost benefits clearly parent exports, as well as exports of affiliates to third countries.

Hence, we need to numerically assess which effects are stronger – those on parent exports or those on affiliate sales. This assessment will give us information about the relationship between home exports from Sweden and foreign affiliate sales, in relative terms, within firms, and further validate or reject the predictions in the previous chapter. The next section will address this issue.

The relationship between home country exports and FDI within multinational firms

We are now ready for a few counterfactual simulations on the export share of the average Swedish MNE in its total sales abroad, depicted in Figure 15.[22]

These counterfactual simulations will shed light on the relationship between home country exports and FDI, and help us understand the fundamental factors driving both parent exports and foreign affiliate sales. Moreover, we will be able to quantify the relative importance of these fundamental factors in driving the export share of the average Swedish MNE in its total sales abroad. Since trade cost estimates are only available from 1978, we can only investigate the export share from 1978 and onwards, seen in Figure 15.

In the first counterfactual simulation we extract/isolate the effects of the growth of the world economy by assuming that the world income has not been growing since the beginning of our data period, keeping both host country GDP and market potential constant. To figure out to what extent the growth of the world economy explains the evolution of the export share, we calculate a hypothetical export share assuming that the size of the world economy remained constant. The hypothetical *market share*, where the *host country size GDP* and the *host countries market access market potential* stayed constant at the 1978 level, is then compared to the development of the "actual" export share, which is the estimated export share based on the regression point estimates. The "actual" export share corresponds to the real export share seen in Figure 15 in the previous chapter. The difference between the actual and the hypothetical ex-

[22] Note that the rest of the sales, subtracting exports from Sweden, are foreign direct investments in terms of foreign affiliate local sales and foreign affiliate 3rd country exports.

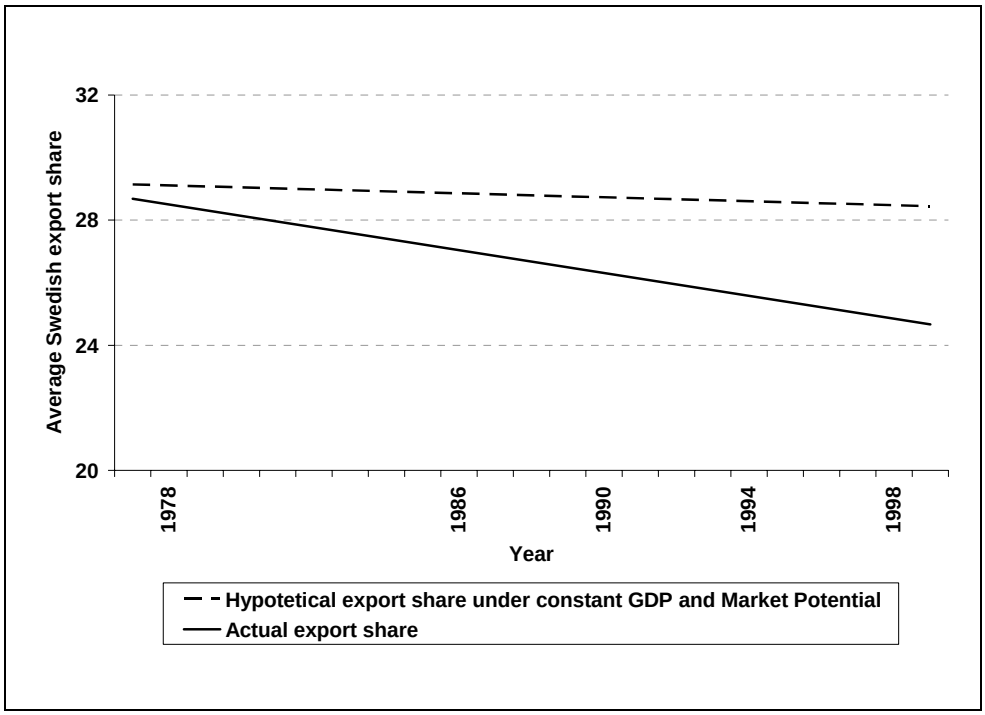
port share can then be attributed to market growth. This will give us answer to the following questions.

1. What would the average level of parent exports to a foreign market have been?
2. What would the local sales, sales to third countries and sales to Sweden have been of an average Swedish-owned foreign affiliate?

Likewise, in order to figure out how much the reduction in trade cost explains the evolution of the export share, we calculate a hypothetical export share assuming that trade costs stayed constant at their 1978 level.

In Figure 22, we display the result from the first simulation, holding market size constant, which in this figure includes both *host country size GDP* and the *host countries market access market potential*. In order to more clearly view the results, we plot the fitted trend curves for the hypothetical export share with world market size kept constant and the actual export share, reflecting historical growth of the world market size.

Figure 22 Actual vs. Simulated Export Share, under constant GDP and Market Potential



Source: RIIE data
Note: The export share is the average share of firms' total sales in a host country which is exported from Sweden.

As can be seen when comparing the actual (filled line) against the simulated export share (dotted line), the average export share within an MNE would have been much larger had the world economy not been growing in size. This figure explains why a growing world economy contributes to a decline of the average export share within an average MNE during the period between 1978 and 1998. Thereto, it indicates that a growing world economy increases the foreign affiliate local sales and the foreign affiliate third country exports to a greater extent than parent exports from Sweden, within firms.

To further separate the channels through which world income growth affects the parent export share in total foreign sales of Swedish MNEs, we isolate the effect through *host country GDP growth* on parent exports and local affiliate sales from the effect through *market potential growth* of export platform FDI (affiliate exports to third markets).

Figure 23 repeats therefore the simulation of Figure 22, holding only *market potential* constant at its 1978-level, whereas Figure 24 keeps only host country size (*GDP*) constant at its 1978 level. That is, while Figure 23 isolates the effects from the *market potential,* Figure 24 isolates the effects from the host country size (*GDP*). Comparing the outcome of the two experiments indicates that the effect of the growth of a host country's *market potential* is stronger than the effect of growing host country *GDP*. This implies that a crucial role for the decline of the parent export share in MNE foreign sales was played by export platform FDI, responding strongly to the growth in income of other regions in the world.

In Figure 25, we show the result of the simulation which holds the trade costs constant. As can be seen the actual export share (filled line) does not deviate from the simulated export share (dotted line). Thus, when keeping trade costs constant on its level in the year 1978, including the status of trade agreements, the trade cost per unit of distance, etc., we find that this hardly contributes at all to the explanation of the decline of the average export share within an MNE. Accordingly, trade costs do not have an impact on the relationship between exports from Sweden and FDI. While this may be surprising, the explanation is simple: the decline in trade costs boosts not only parent exports but also affiliate exports to third countries and these two effects neutralize each other.

Figure 23 Actual vs. Simulated Export Share, under constant Market Potential

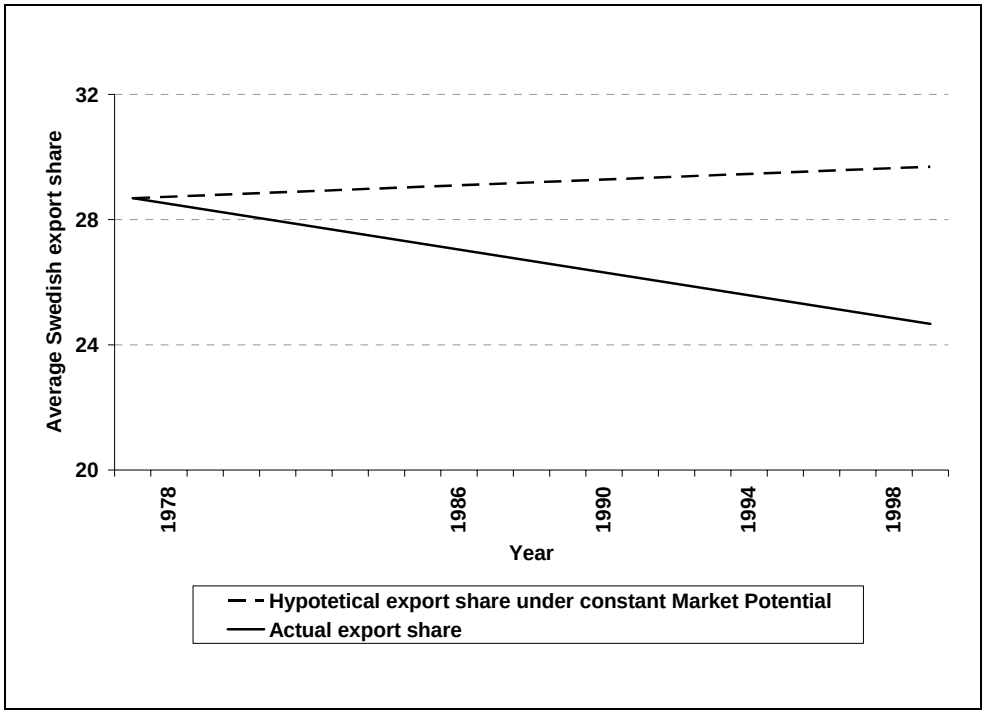


Figure 24 Actual vs. Simulated Parent Export Share, under constant GDP

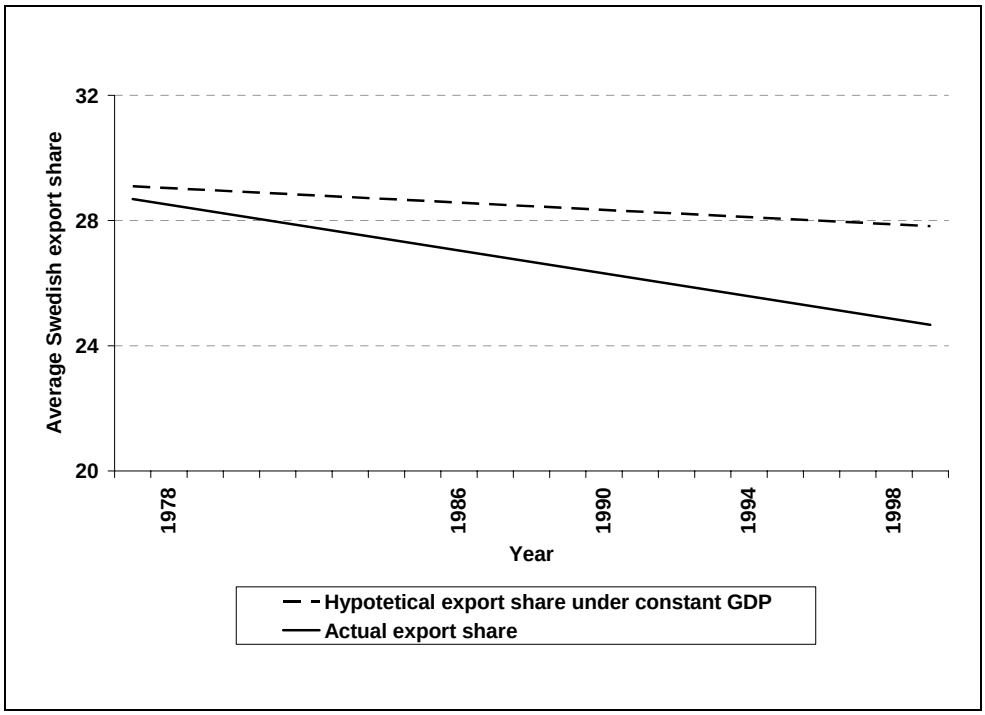
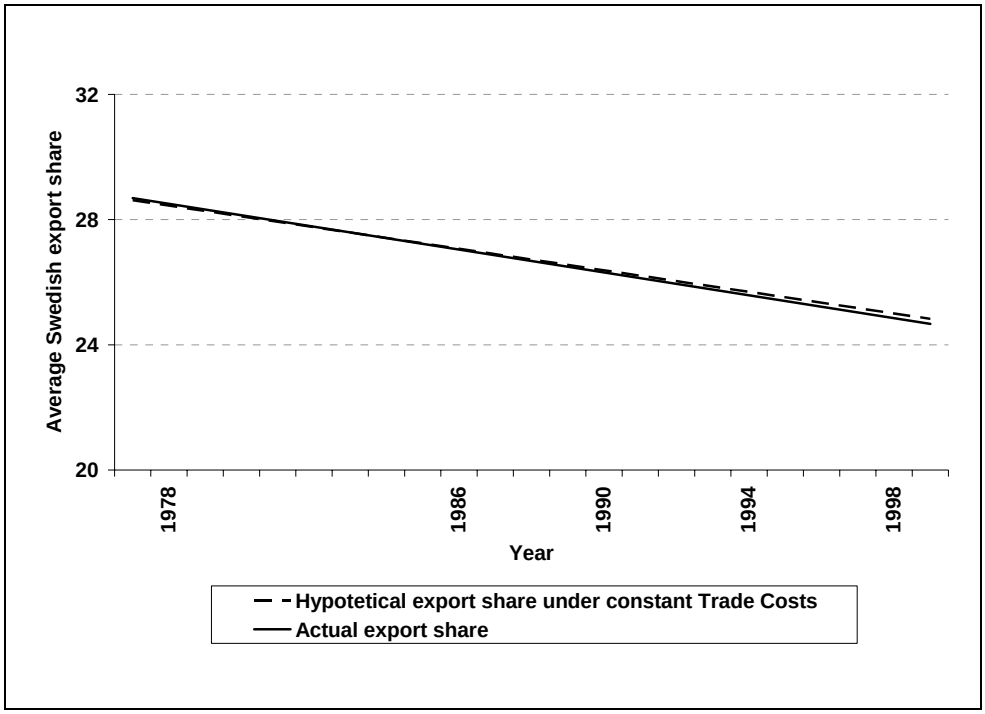


Figure 25 Actual vs. Simulated Parent Export Share, under constant Trade costs



In sum, we find that almost all of the decline in the share of exports from Sweden (and increase of FDI) within Swedish multinational firms can be attributed to the increased size of the world economy: increasing the size of the destination markets and the host country proximity to other large markets, increases affiliate sales to the local market as well as affiliate exports to the rest of the world.

This result validates the theoretical predictions in the previous chapter and gives an explanation to the rise in third country exports of the foreign affiliates. Thus, as the world economy grows, firms may opt to supply customers on foreign markets via FDI instead of exports, in relative terms.

6 Conclusions

As the world economy has become increasingly more integrated through international trade and foreign direct investment, Swedish multinational firms have allocated increasingly more activities to foreign destinations. This raises questions on how international trade and foreign direct investments are related and especially whether foreign affiliate production and sales activities by Swedish multinational firms may substitute for home country exports from Sweden.

Reviewing the theoretical literature, it can be concluded that while horizontal investments, seeking to establish foreign production to secure better access to foreign markets, can substitute for exports from the home country, vertical investments, seeking to exploit factor price differences between countries by dividing up the production chain, can promote intra-firm trade and thereby complement home country exports.

Given the fact that FDI mostly flows between developed countries and thus appears to be predominantly horizontal or market seeking in nature, it is expected from theory that FDI replaces home country exports. However, the evidence from the empirical literature is far from conclusive and the majority of the previous studies do in fact find a positive complementary relationship, where foreign direct investments promote home country exports, and vice versa.

Recent theoretical and empirical findings do, however, tell us that FDI and international trade may be driven simultaneously by the same underlying factors, indicating that the relationship between international trade and FDI goes through these common determinants.

Based on the recent theoretical and empirical literature on how international trade and FDI are related, this study examines how international trade and foreign direct investments are related by evaluating the impact of increased world economy and trade liberalization on the Swedish exports and foreign affiliate production.

The analysis is based on firm level data on Swedish multinational firms within a three-country model of FDI with heterogeneous firms.

The results show that a growing world economy increases the Swedish exports as well as the foreign direct investments. However, based on the relative numerical importance of the various sales types, we find that a world income growth promote platform FDI, in terms of affiliate exports to third countries, more than the Swedish firm exports, in relative terms. That is, as the world economy grows firms may opt to supply foreign markets through FDI instead of exports – in relative terms – since it may be more profitable to do so. This is consistent with theory.

The analysis further shows that the steady decline in trade costs do not only increase Swedish firm exports but also FDI. The numerical prediction further shows that the two effects neutralize each other.

7 References

Anderson, J. (1994), Measuring the Welfare Impact of Fiscal Policy, Boston College Working Papers in Economics 272, Boston College Department of Economics.

Anderson, J. and E. van Wincoop (2003), Gravity with Gravitas: A Solution to the Border Puzzle, American Economic Review, Vol. 93(1), pages 170-192, March.

Baier, S. and J.H. Bergstrand (2001), International Trade in Services, Free Trade Agreements, and the WTO, in Robert Stern, ed., Services in the International Economy, Ann Arbor, MI: The University of Michigan Press, 2001.

Barba-Navaretti, G. and A.J. Venables (2004), Multinational Firms in the World Economy. Princeton, NJ: Princeton University Press.

Bergsten, C., F.T. Horst and T.H. Moran (1978), American Multinationals and American Interests, Washington, DC: Brookings Institution.

Blonigen, B.A. (2001), In search of substitution between foreign production and exports, Journal of International Economics 53(1): 81-104.

Blonigen, B.A., R.B. Davies and K. Head (2003), Estimating the knowledge-capital model of the multinational enterprise: Comment. American Economic Review 93, 980-994.

Braconier, H., P.J. Norbäck and D. Urban (2005a), Multinational Enterprises and Wage Costs: Vertical FDI Revisited, Journal of International Economics, 67(2), s. 446-470.

Braconier, H., P.J. Norbäck and D. Urban (2005b), Reconciling the Evidence of the Knowledge Capital Model, Review of International Economics, 12(4), s. 770-786.

Brainard, L. (1997), An Empirical Assessment of the Proximity-Concentration Trade-off between Multinational Sales and Trade, American Economic Review, 87, 4.

Braunerhjelm, P., and K. Ekholm (1998), The Geography of Multinational Firms. Kluwer Academic Publishers, Boston, Dordretch, and London.

Brenton P., F. Di Mauro and M. Lücke (1998), Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe, Kiel Working Paper 890.

Buckley, P, and M. Casson (1976), The Future of Multinational Enterprises, London: Macmillan.

Büthe T. and H.V. Milner (2006), The Politics of Foreign Direct Investment into Developing Countries Increasing FDI through International Trade Agreements, Working Paper, October 25, 2005.

Carr, D.L., J.R. Markusen and K.E. Maskus (2001), Estimating the knowledge-capital model of the multinational enterprise. American Economic Review 91, 693-708.

Clausing, K. (2000), Does multinational activity displace trade? Economic Inquiry, Volume 38, Number 2, April 2000, pp. 190-205(16)

Co, C. (1997), Japanese FDI into the US automobile industry: An empirical investigation, Japan and the World Economy 9(1): 93-108.

Dunning J.H. (1974), Economic Analysis and the Multinational Enterprise. London: Allen & Unwin.

Dunning, J.H. (1981), Multinational Enterprises Economic Structure and International Competitiveness, New York: John Wiley and Sons

Dunning, J.H. (1985), Multinationals, Technology and Competitiveness, London: Unwin Hyman

Ethier, W.J. (1986), The multinational firm, Quarterly Journal of Economics, 101:4, pp. 805-33.

Ethier, W.J. and J.R. Markusen (1996), Multinational firms, technology diffusion and trade, Journal of International Economics, 41:1, pp. 1-28.

Feinberg S. and M. Keane (2003), Accounting for the Growth of MNC-based Trade using a Structural Model of US MNCs. Yale University. Mimeo.

Forte, R. (2004), The relationship between foreign direct investments and international trade: Substitution or complementarity? A survey. CETE Working paper No 140.

Grossman, G.M. and E. Helpman (2002), Integration vs. outsourcing in industry equilibrium, Quarterly Journal of Economics, 117:1, pp. 85-120.

Grubert, H. and J. Mutti (1991), Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making, Review of Economics and Statistics, 73(2): 285-293.

Hakkala K. and D. Zimmermann (2005), Foreign Operations of Swedish Manufacturing Firms Evidence from the IUI Survey On Multinationals 2003. The Research Institute of Industrial Economics, Working Paper No. 650, 2005

Hamilton D. and J. Quinlan (2005), Deep Integration: How Transatlantic Markets are Leading Globalization, Centre for European Policy Studies.

Hanson G.H., R.J. Mataloni and M.J. Slaughter (2005), Vertical Production Networks in Multinational Firms, The Review of Economics and Statistics, MIT Press, vol. 87(4), pages 664-678, November.

Head, K. and J. Ries (2001), Overseas Investment and Firm Exports, Review of International Economics, 9(1): 108-22.

Helpman, E. (1984), A simple theory of trade with multinational corporations, Journal of Political Economy 92, 451-471.

Helpman, E. (1985), Multinational Corporations and Trade Structure, Review of Economic Studies, p. 443-458.

Helpman E., M.J. Melitz and S.R. Yeaple (2004), Export Versus FDI with Heterogeneous Firms, American Economic Review, Vol. 94, Number 1, 1 March 2004, pp. 300-316(17)

Herzing M., P.J. Norbäck and L. Persson (2007), Effektivitetseffekter av utländska direktinvesteringar - En översikt av nationalekonomisk forskning, 2006-09 Arbetsrapport, R2006:004, ITPS

Henrekson, M., and U. Jakobsson (2003), The Transformation of Ownership Policy and Structure in Sweden: Convergence towards the Anglo-Saxon Model? New Political Economy, Vol. 8, No. 1, 2003

Horstmann, I. and J.R. Markusen (1992), Endogenous Market Structures in International Trade (Natura Facit Saltum), Journal of International Economics, 32, s. 109-129.

Hummels, D. (2007), Transportation Costs and International Trade in the Second Era of Globalization, Journal of Economic Perspectives, American Economic Association, vol. 21(3), pages 131-154, Summer.

Hymer, S.H. (1976), The International Operation of National Firms: A Study of Direct Investment, Boston, MA: MIT; (1960 MIT thesis).

IMF (2001), International Finance Statistics Yearbook, Washington, DC.

Kindleberger, C.P. (1969), American Business Abroad, New Haven: Yale University Press.

Lai, H., and S.C. Zhu (2006), U.S. Exports and Multinational Production, Review of Economics and Statistics 88:3, 531-548.

Lipsey, R.E. and M.Y. Weiss (1981), Foreign Production and Exports in Manufacturing Industries, Review of Economics and Statistics, 63(4): 488-94.

Lipsey, R.E. and M.Y. Weiss (1984), Foreign Production and Exports of Individual Firms, Review of Economics and Statistics, 66(2): 304-07.

Lipsey, R.E., E. Ramstetter and M. Blomström (2000), Outward FDI and Parent Exports and Employment: Japan, the United States, and Sweden, NBER Working Paper No. 7623.

Markusen, J.R. (1984), Multinationals, multiplant economies, and the gains from trade, Journal of International Economics 16, 205-226.

Markusen, J.R. (1997), Trade versus investment liberalization, NBER Working Paper number 6231.

Markusen, J.R. (2002), Multinational Firms and the Theory of International Trade, The MIT Press, Cambridge.

Markusen, J.R. and K.E. Maskus (2001) General-equilibrium approaches to the multinational firm: A review of theory and evidence, NBER Working Paper Number 8334.

Markusen, J.R. and K.E. Maskus (2002) Discriminating among alternative theories of the multinational enterprise, Review of International Economics 10, 694-707.

Markusen, J.R. and A.J. Venables (1998), Multinational firms and the new trade theory, Journal of international economics, 46(2), 183-204.

Markusen, J.R. and A.J. Venables (2000), The theory of endowment, intra-industry and multinational trade, Journal of international economics, 52(2), 209-234.

Mundell, R.A. (1957), International Trade and Factor Mobility, The American Economic Review, Vol. 47, No. 3 pp. 321-335.

Nicita, A. and M. Olarreaga (2006), Trade, Production and Protection 1976-2004, World Bank: Washington DC.

Nordström, H. (2005), Handelspolitik lägesrapport 2005:1: Ny vår för svensk export.

Norbäck, P.J. (2001), Multinational firms, technology and location, Journal of International Economics, Elsevier, vol. 54(2), pages 449-469, August.

Norbäck, P.J., D. Urban, and S. Westerberg (2007), Gravity Estimation for Multinational Enterprises: An application to the GATT/WTO Puzzle, RIIE Working Paper.

Obstfeld M. and K. Rogoff (2000), The Six Major Puzzles in International Macroeconomics: Is There a Common Cause? NBER Working Papers with no. 7777.

OECD (1996), Benchmark Definition of Foreign Direct Investment, 3rd Edition, Paris.

Olarreaga, M. (1998), Why Are Trade Agreements More Attractive In The Presence Of Foreign Direct Investment? World Trade Organization Staff Working Paper, ERAD-98-03, Geneva.

Pfaffermayr, M. (1996), Foreign outward direct investment and exports in Austrian manufacturing: Substitutes or complements?

Rose, A.K. (2004), Do We Really Know that the WTO increases Trade?, American Economic Review, Vol. 94, issue 1.

Sachs, J.D. and H.J. Shatz (1994) Trade and Jobs in U.S. Manufacturing, Brookings Papers on Economic Activity, Vol. 1994, No. 1 (1994).

Simmons, B. (2000), International law and state behavior: commitment and compliance in international monetary affairs, American Political Science Review, 94: 819–35.

Sundin, A. and Sundqvist S.I. (2001), Ägarna och makten i Sveriges börsföretag, Dagens Nyheters Bokförlag.

Svensson, R. (1996), Effects of Overseas Production on Home Country Ex-ports: Evidence Based on Swedish Multinationals, Review of World Economy, vol. 132, pp. 304-29, 1996.

Swedenborg, B. (1979), The Multinational Operations of Swedish Firms: An Analysis of Determinants and Effects, Stockholm, Sweden: The Industrial Institute for Economic and Social Research.

Swedenborg, B. (1982), Svensk Industri i Utlandet: en Analys av Drivkrafter och Effekter, Sweden: The Industrial Institute for Economic and Social Research.

UNCTAD (1996), World Investment Report 1997, Investment, Trade and International Policy Arrangements, United Nations, New York and Geneva.

UNCTAD (1997), World Investment Report 1997, FDI and Competition Policy, United Nations, New York and Geneva.

UNCTAD (2006), World Investment Report 1997, FDI and Competition Policy, United Nations, New York and Geneva.

Waldkirch, A. (2003), The New Regionalism and Foreign Direct Investment: The Case of Mexico, Journal of International Trade & Economic Development, Vol. 12.

WTO (1998), World Trade Report 1998, Geneva: WTO.

Yeaple, S.R. (2003a), The role of skill endowments in the structure of U.S. outward foreign direct investment, Review of Economics and Statistics 85, 726-734.

Yeaple, S.R. (2003b), The complex integration strategies of multinationals and cross country dependencies in the structure of foreign direct investment, Journal of International Economics, Volume 60, Issue 2.

Yeats, A. (1998), Just How Big is Global Production Sharing? World Bank Policy Research Working Paper nr. 1871.

8 Regression tables

Table 7 Regression results: Exports from Sweden

	Parent Exports			
	(1)	**(2)**	**(3)**	**(4)**
GDP	0.477***	0.490***	0.503***	0.506***
	(12.23)	(14.77)	(15.17)	(14.89)
GDP/cap	0.670***	0.600***	0.637***	0.623***
	(7.60)	(7.89)	(8.21)	(8.02)
Trade cost (host)	0.071	-1.25***	-1.282***	-1.254***
	(0.48)	(2.70)	(2.73)	(2.65)
Firm size	0.596***	0.565***	0.367***	0.632***
	(26.71)	(27.44)	(5.09)	(23.34)
R&D	0.102***	0.121***	-0.014	0.052***
	(4.77)	(6.19)	(0.94)	(3.10)
Previous exp.	0.640***	0.689***	0.687***	0.592***
	(6.75)	(7.59)	(10.34)	(8.49)
Distance	-0.826***	-0.399***	-0.403***	-0.430***
	(8.72)	(2.69)	(2.67)	(2.79)
CEFTA	-0.658***	-0.395**	-0.394***	-0.366**
	(4.71)	(2.58)	(2.96)	(2.51)
EU	-0.082	-0.071	-0.096	-0.069
	(0.64)	(0.57)	(0.84)	(0.58)
NAFTA	0.101	0.181	0.126	0.160
	(0.72)	(1.44)	(0.96)	(1.15)
ASEAN	0.348*	0.356	0.540*	0.564**
	(1.71)	(1.64)	(1.97)	(2.20)
MERCOSUR	0.696***	0.736***	0.641***	0.724***
	(3.78)	(4.34)	(3.83)	(4.20)
Year effects	Yes	Yes	Yes	Yes
ISIC2_3dig effects		Yes	Yes	Yes
Firm effects			Yes	
Industry effects				Yes
Observations	9998	9998	9998	9939
R-squared	0.45	0.49	0.62	0.59

Notes: Robust t statistics in parentheses, clustered on export destination countries
* significant at 10%; ** significant at 5%; *** significant at 1% level

Table 8 Regression results: Affiliate Local Sales

	Affiliate Local Sales			
	(1)	**(2)**	**(3)**	**(4)**
Age	0.023***	0.025***	0.026***	0.026***
	(11.35)	(13.01)	(13.73)	(13.83)
GDP	0.316***	0.352***	0.398***	0.396***
	(8.59)	(9.18)	(8.96)	(9.53)
GDP/cap	0.285***	0.264**	0.252**	0.243**
	(2.94)	(2.60)	(2.18)	(2.13)
Firm size	0.211***	0.178***	0.069***	0.137***
	(14.80)	(13.73)	(5.53)	(8.56)
R&D	0.000	0.026	0.002	0.048*
	(0.01)	(0.92)	(0.06)	(1.78)
Previous exp.	0.048	0.173	0.294**	0.411**
	(0.36)	(1.27)	(2.05)	(2.50)
Distance	-0.051	-0.046	-0.063	-0.065
	(1.05)	(1.02)	(1.30)	(1.38)
CEFTA	-0.589***	-0.708**	-0.568	-0.528*
	(2.70)	(2.40)	(1.64)	(1.82)
EU	0.008	-0.029	-0.163*	-0.088
	(0.08)	(0.33)	(1.70)	(0.99)
NAFTA	0.020	-0.014	-0.090	-0.022
	(0.22)	(0.14)	(0.80)	(0.23)
ASEAN	-0.416	-0.400	-0.649**	-0.546**
	(1.12)	(1.27)	(2.12)	(2.04)
MERCOSUR	0.371**	0.350**	0.186	0.262*
	(2.59)	(2.57)	(1.32)	(1.99)
Year effects	Yes	Yes	Yes	Yes
ISIC2_3dig effects		Yes	Yes	Yes
Firm effects			Yes	
Industry effects				Yes
Observations	3149	3121	3121	3105
R-squared	0.32	0.38	0.52	0.47

Notes; Robust t statistics in parentheses, clustered on host countries
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9 Regression results: Export Platform FDI

	Export Platform FDI			
	(1)	**(2)**	**(3)**	**(4)**
Age	0.005	0.008*	0.013***	0.013***
	(1.11)	(1.97)	(3.84)	(3.71)
Market potential	0.775***	0.656***	0.500**	0.597***
	(2.93)	(2.69)	(2.38)	(2.81)
GDP/cap	0.743***	0.748***	0.791***	0.813***
	(5.41)	(5.29)	(5.40)	(5.34)
Trade cost (third)	-0.392**	-0.542**	-0.896***	-0.789***
	(2.08)	(2.14)	(3.09)	(2.91)
Firm size	0.227***	0.202***	0.049	0.159***
	(9.99)	(7.47)	(1.39)	(4.40)
Distance	0.306*	0.311**	0.318**	0.323**
	(1.93)	(2.08)	(2.17)	(2.20)
R&D	0.093**	0.125***	-0.045	0.033
	(2.11)	(3.19)	(0.60)	(0.57)
Previous exp.	0.212	0.297	0.577*	0.379
	(0.92)	(1.44)	(1.69)	(1.61)
CEFTA	0.338	0.346	0.235	0.297
	(1.45)	(1.38)	(0.53)	(0.93)
EU	0.820***	0.843***	0.842***	0.774***
	(3.93)	(4.62)	(4.85)	(4.57)
NAFTA	0.646***	0.660***	0.749***	0.697***
	(3.23)	(3.04)	(3.33)	(3.24)
ASEAN	1.322***	1.267***	1.480***	1.310***
	(3.80)	(3.55)	(5.16)	(3.45)
MERCOSUR	1.032***	0.910***	0.588***	0.775***
	(6.88)	(5.62)	(3.35)	(4.62)
Year effects	Yes	Yes	Yes	Yes
ISIC2_3dig effects		Yes	Yes	Yes
Firm effects			Yes	
Industry effects				Yes
Observations	2246	2246	2246	2236
R-squared	0.28	0.32	0.48	0.42

Notes: Robust t statistics in parentheses, clustered on host countries
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10 Regression results: Exports of Swedish intermediate inputs

	Affiliate Inputs from Sweden			
	(1)	**(2)**	**(3)**	**(4)**
Age	0.010**	0.016***	0.020***	0.020***
	(2.63)	(4.07)	(5.64)	(5.67)
GDP	0.104	0.169**	0.249***	0.260***
	(1.59)	(2.21)	(3.16)	(3.62)
GDP/cap	0.354***	0.285***	0.290***	0.283***
	(3.12)	(3.03)	(3.26)	(3.29)
Trade cost	0.385	0.392	0.677	0.406
	(0.97)	(0.59)	(0.97)	(0.68)
Firm size	0.165***	0.128***	0.060	0.093***
	(4.57)	(4.22)	(1.52)	(3.00)
Distance	-0.017	0.177	0.111	0.050
	(0.10)	(0.92)	(0.50)	(0.27)
R&D	0.113**	0.125***	-0.008	0.068*
	(2.23)	(2.87)	(0.16)	(1.89)
Previous exp.	-0.102	-0.118	0.481	0.340
	(0.39)	(0.45)	(1.07)	(0.91)
CEFTA	-0.058	0.040	-0.416	-0.160
	(0.06)	(0.06)	(0.68)	(0.26)
EU	0.504***	0.388***	0.001	0.012
	(2.73)	(2.68)	(0.01)	(0.09)
NAFTA	-0.378	-0.300	-0.649	-0.655
	(0.80)	(0.53)	(1.14)	(1.34)
ASEAN	1.154**	0.965**	0.031	0.516
	(2.13)	(2.45)	(0.08)	(1.28)
MERCOSUR	0.479	0.085	-0.027	-0.098
	(1.51)	(0.39)	(0.11)	(0.40)
Year effects	Yes	Yes	Yes	Yes
ISIC2_3dig effects		Yes	Yes	Yes
Firm effects			Yes	
Industry effects				Yes
Observations	1314	1314	1314	1302
R-squared	0.18	0.30	0.52	0.48

Notes: Robust t statistics in parentheses, clustered on host countries
* significant at 10%; ** significant at 5%; *** significant at 1%

9 Appendix

9.1 Definition of Foreign Direct Investment

The definition of foreign direct investment and related components, according to the guidelines of the OECD (1996) and the IMF (2001).

Foreign direct investment, from the viewpoint of the balance of payments, reflects the aim of obtaining a *lasting interest* by a resident entity of one economy - *direct investor* - in an enterprise that is resident in another economy. The *lasting interest* implies the existence of a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the latter. Foreign direct investment involves both the initial transaction establishing the relationship between the investor and the enterprise and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

A foreign direct investor, as mentioned above, can be an *incorporated* or *unincorporated* public or private enterprise, a government, an individual and a group of related individuals, or a group of related enterprises, both incorporated or unincorporated, which has a direct investment enterprise operating in one country other than the country or countries of residence of the foreign direct investor or investors.

A foreign direct investment enterprise is defined as an incorporated or unincorporated enterprise in which a foreign investor owns 10 % or more of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated enterprise. The definition of a foreign direct investment relationship is set by a numerical threshold ownership of 10 % of a company's capital, comprising ordinary shares or voting stocks. This percentage is set as a dividing line between foreign direct investment and portfolio investment in the form of shareholdings. The management representation, as stipulated by the ownership of at least 10 %, implies that the direct investor is able to influence or participate in the management of an enterprise. However, when collecting the investment statistics, some countries are flexible to the 10 % cut-off point concerning a foreign direct investment relationship, and take into account a combination of factors such as; representation on the board of directors, participation in policy-making processes, and material inter-company transactions, among other things.

A direct investment enterprise could be an incorporated enterprise (subsidiary or associate company) or an unincorporated enterprise (branch).

A subsidiary is an incorporated enterprise in which

- A foreign investor controls directly or indirectly more than 50% of the share-holders' voting power, or;

- The foreign investor has the right to appoint or remove a majority of the members of the enterprise's administrative, management or supervisory body

An associate is an enterprise where the direct investor and its subsidiaries control between 10% and 50% of the voting shares.

A branch is an unincorporated enterprise in the host country that fulfils one or several statements.

- is a permanent establishment or office of a foreign direct investor, or;
- is an unincorporated partnership or joint venture between a foreign direct investor and third parties, or;
- is real estate structures and immovable equipment and objects, in the host country, that are directly owned by a foreign resident, or;
- is mobile equipment that operates within an economy for at least one year if accounted for separately by the operator

Foreign direct investment flows are generally depicted on a net basis, in which capital transaction credits are deducted from capital transaction debits, between direct investors and their foreign affiliates. Net decreases in outward FDI (assets) or net increases in inward FDI (liabilities) are recorded as credits, with a positive sign in the balance of payments, while net increases in outward FDI or net decreases in inward FDI are recorded as debits, with a negative sign in the balance of payments. That is, a negative sign implies that the net outward FDI outrank the net inward FDI, and that at least one of the three components of FDI (equity capital, reinvested earnings or intra-company loans) is negative and not offset by positive amounts of the remaining components.

FDI flows are formally defined as follows:

- *For subsidiary and associated companies***:**
  1. the direct investor's share of the company's reinvested earnings;
  2. plus the direct investor's purchases less sales of the company's shares, debt securities (bonds, notes, money market and financial derivative instruments) and loans (including non-cash acquisitions made against equipment, manufacturing rights, etc.);
  3. less the company's net purchases of the direct investors' shares, debt securities (bonds, notes, money market and financial derivative instruments) and loans;
  4. plus the net increase in trade and other credit (including debt securities) given by the direct investor to the company;
  5. less the balance outstanding at the beginning of the period, and less the net increase between the opening and closing balances which is due to revaluations and exchange rate movements

- *For branches*
    1. the increase in reinvested profits;
    2. plus the net increase in funds received from the direct investor, measured as the increase in the net worth of the enterprise to the investor;
    3. less increases (net of decreases) due to revaluations and exchange rate movements

Foreign direct investment stocks are estimated, at book value or historical cost, by either cumulating FDI flows over a period of time or adding flows to an FDI stock that has been obtained for a particular year on assets and liabilities of direct investment. The FDI stocks could be seen as an indirect activity measurement of MNEs outside their home countries and the parent firms' financial stakes in their foreign affiliates, since the stocks are the amount of direct investment, or the "direct investment position," of a country, as calculated from direct investment stock data or cumulated flows of direct investment.

FDI Stocks are formally defined as follows

- *For subsidiary and associate companies*:
    1. the market or book value, derived from the balance sheets, and reserves (retained profits) attributable to the direct investor;
    2. plus loans, trade credit and debt securities (bonds, notes, money markets instruments, financial derivatives etc.) due from the subsidiaries and associates to the direct investor, including dividends declared but not yet paid to the direct investor;
    3. less loans, trade credit and other liabilities due to subsidiaries and associates from the direct investor
- *For branches*
    1. the market or value of fixed assets, investments and current assets, excluding amounts due from the direct investor;
    2. less the concern's liabilities to third parties.

9.2 A Heterogeneous Firm Model of MNEs

We consider three countries, a Home country (H), a Southern country (S) (that is potential host to MNEs from H), and a Rest of the World (R). There are three sectors: a homogeneous goods sector producing the good Y, and two differentiated goods sectors. MNEs will exist only in the differentiated goods sector. Moreover, there is one production factor labor L with the endowments L_i for $i = H, S, R$. Consumers in all countries have identical utility functions which consist of a Cobb-Douglas upper-tier function with income shares a and a^* for differentiated goods sectors 1 and 2, respectively. The lower-tier utility functions for differentiated goods consist each of a CES function on a continuum of goods with substitution elasticity σ.

9.2.1 The homogeneous goods sector

The homogeneous goods price is numeraire. There is a labor coefficient $1/a_i$ for the technology of the homogeneous good in each country i, $i = H, S, R$. We assume that labor endowments are such that there is diversification in all countries. There is perfect competition. Hence, the wage in each country is quasi exogenous such that $w_i = a_i$.

9.2.2 The differentiated goods sector

All firms in the first differentiated goods sector are owned by country H. Conversely, all differentiated goods firms in sector 2 are owned by country R. Country S has no own firms in this industry since it lacks technological knowledge, but may have foreign affiliates. We focus on sector 1 among the differentiated goods sectors. The other sector is analogue. There is a continuum of firms in each differentiated goods sector which differ only by their productivity, i.e. there is an exogenous labor coefficient $1/\theta$ specific to the firm (and independent of the country where a production plant is located) with $0 < \theta < \infty$. There is a frequency distribution over all firms in this sector $g_H(\theta)$. For notational convenience, we normalize the total mass of firms to one. There is no fixed cost of exporting, but iceberg transport cost, t_{ij} for shipping goods from destination i to destination j.

Hence, all firms serve all markets. Furthermore, we assume $a_i < a_j(1+t_{ij})$ for all countries $i \neq j$. This ensures that there will be some differentiated goods production in each country. Moreover, $a_S < a_i$ for $i = R, H$ which renders country S a low-cost location.

We restrict the firm choice to three firm types - *exporting firms, export platform FDI, and horizontal FDI*.

- Exporting firms have a plant in the home country (H) and export to the other two countries.
- Export platform FDI has a plant in the home country (H) and in country S, but exports from S to R.
- Horizontal FDI has a plant in each country.

Foreign plants require a fixed cost f per plant in terms of the numeraire good while the fixed cost for the home plant is assumed to be already sunk.

Under the stated parameter constraints, there will thus always be production in the home country and firms will always make strictly positive profits.

Operating profits of a differentiated goods firm when producing in country i and serving a market in country j, π_{ij}, is given by

$$\pi_{ij} = \left[\frac{p_{ij}(\theta)}{(1+t_{ij})} - \frac{w_{ij}}{\theta} \right] x_{ij},$$

where x_{ij} is goods demand, and t_{ii}=0. The optimal pricing decision is given by $p_{ij} = (\sigma/(\sigma-1))(1+t_{ij})(w_i/\theta)$ and output by

$$x_{ij} = \left(\frac{\sigma}{\sigma-1} \right)^{-\sigma} \theta^{\sigma} (1+t_{ij})^{-\sigma} w_i^{-\sigma} \frac{\alpha I_j}{P_j},$$

where I_j is the income of country j, and $P_j^{1/(1-\sigma)}$ is the ideal price index corresponding to the CES sub utility function.

Profit functions of the three firm types are:

Export firm:

$$\Pi^{EFIRM} = \rho \Theta w_H^{1-\sigma} \left(\frac{\alpha I_H}{P_H} + (1+t_{HS})^{-\sigma} \frac{\alpha I_S}{P_S} + (1+t_{HR})^{-\sigma} \frac{\alpha I_R}{P_R} \right),$$

with $\rho = \sigma^{-\sigma}(\sigma-1)^{\sigma-1}$ and $\Theta = \theta^{\sigma-1}$ is the productivity index.

Export platform firm:

$$\Pi^{PFDI} = \rho\Theta\left(w_H^{1-\sigma} \frac{\alpha I_H}{P_H} + w_S^{1-\sigma} \frac{\alpha I_S}{P_S} + (1+t_{SR})^{-\sigma} w_S^{1-\sigma} \frac{\alpha I_R}{P_R} \right) - f,$$

Horizontal FDI Firm

$$\Pi^{HFDI} = \rho\Theta\left(w_H^{1-\sigma} \frac{\alpha I_H}{P_H} + w_S^{1-\sigma} \frac{\alpha I_S}{P_S} + w_R^{1-\sigma} \frac{\alpha I_R}{P_R} \right) - 2f,$$

Note that all three profit schedules are linear in the productivity index Θ. Under the stated assumptions holds

$$\frac{\partial \Pi^{HFDI}}{\partial \Theta} < \frac{\partial \Pi^{PFDI}}{\partial \Theta} < \frac{\partial \Pi^{EFIRM}}{\partial \Theta}$$

Hence, horizontal FDI can only exist for large levels of productivity while exporting firms can only exist for low levels of productivity. These two firm types will always exist if the range of productivity θ is sufficiently close to zero and infinity which we will assume henceforth.

Next, we can define the level of productivity of a firm for which a firm is indifferent of exporting and export platform FDI, Θ_H^{PFDI} (1)

$$\Theta_H^{PFDI} = \frac{f}{\rho\left[\left(w_S^{1-\sigma} \frac{\alpha I_S}{P_S} + (1+t_{SR})^{-\sigma} w_S^{1-\sigma} \frac{\alpha I_R}{P_R} \right) - w_H^{1-\sigma} \left((1+t_{HS})^{-\sigma} \frac{\alpha I_S}{P_S} \right) + (1+t_{HR})^{-\sigma} \frac{\alpha I_R}{P_R} \right]},$$

while the productivity level of the firm that is indifferent of export platform FDI and horizontal FDI is given by, Θ_H^{HFDI} (2)

$$\Theta_H^{HFDI} = \frac{f}{\rho\left[\left(w_R^{1-\sigma} - (1+t_{SR})^{-\sigma} w_S^{1-\sigma} \frac{\alpha I_R}{P_R} \right) \right]},$$

Under suitable parameter constellations, we also have that $\Theta_H^{PFDI} < \Theta_H^{HFDI}$ which we will henceforth assume. Then follows immediately that there will be exporting firms for a productivity index smaller than Θ_H^{PFDI}, horizontal FDI for productivity levels larger than Θ_H^{HFDI}, and export platform FDI in-between. Note that the cut off levels depend on the endogenous price indices and the endogenous income terms. All other variables are (quasi) exogenous.

9.2.3 Estimating the Model

Firm z export value in terms of consumer prices from H to S are given by

$$Swedish\_Exports_{ZS} = \sigma\rho\Theta_Z w_H^{1-\sigma}(1+t_{HS})^{1-\sigma}\frac{\alpha I_S}{P_S}$$

Note that a market access measure is not entering this equation. Firm level exports of H-firm affiliates from S to R are given by

$$Affiliate\_Exports_{ZR} = \sigma\rho\Theta w_S^{1-\sigma}(1+t_{SR})^{1-\sigma}\frac{\alpha I_R}{P_R}$$

Local sales of H-country affiliates are given by

$$Local\_Sales_{ZS} = \sigma\rho\Theta w_S^{1-\sigma}\frac{\alpha I_S}{P_S}.$$

In terms of data, Θ_Z can be approximated by a firm size variable, $\sum_Z$, i.e. $\Theta_Z = \sum_Z + \varepsilon_Z$ with ε_Z a log-normally distributed random variable, w_i by GDP per capita or some toolmaker wage or the US Bureau of Labor statistics average hourly wage cost, $\frac{\alpha I_S}{P_S}$ is the real consumption value (=production value-exports + imports) in an industry to which the firm z belongs in country S, and $\frac{\alpha I_R}{P_R}$ can be calculated as market access measure on the same industry consumption variables (World Bank data).[23]

[23] See, http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21085384~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

The final estimation equation is the estimation of the probability that FDI occurs, i.e.

$$P(FDI) = E\left[I\left[\Theta_H^{PFDI} - \sum_Z \quad > 0\right]\right],$$

where $I(.)$ is the indicator function, and Θ_H^{HFDI} can be log-linearized in its arguments by a Taylor expansion around the mean of the endogenous variables. This equation is used to analyze the extensive margin of FDI. To estimate this equation one need not only know where a parent has located its foreign affiliates, but also where a firm exports to from the home plant, instead. There are two problems in our data with this respect. First, most firms are multi-product firms. Hence, the activities of affiliates and parent need to be split up according to their divisions. Unfortunately, we do not have such information for parent exports. Second, export destinations are sometimes aggregated from country-level information to continents or regions. In this case, it is again not possible to exactly identify where a parent exports to instead of undertaking FDI. For these two reasons of data availability we must abstain from estimating the extensive margin.

9.2.4 Analyzing Aggregate Exports

Aggregate exports are given by

Aggregate Swedish Exports =

$$= \int_0^{\Theta_H^{PFDI}} g_H(\theta) \cdot Swedish\_Exports_{ZS} d\theta + \int_0^{\Theta_H^{PFDI}} g_H(\theta) \cdot Swedish\_Exports_{ZR} d\theta$$

$$= \left[\sigma\rho w_H^{1-\sigma} (1+t_{HS})^{1-\sigma} \frac{\alpha I_S}{P_S} + \sigma\rho w_R^{1-\sigma} (1+t_{HR})^{1-\sigma} \frac{\alpha I_R}{P_R} \right] B(0, \Theta_H^{PFDI}$$

The term Aggregate Swedish Exports just sums up exports of all exporting firms over all countries. Hence, changes in aggregate Swedish exports depend on three factors. Changes in the level of exports of existing exporting firms, change in the number of exporting firms, change in the exogenous productivity distribution of all firms.

The Swedish share of exports is then just to be divided by the value of world exports, which are given by

Aggregate World Exports

$$= \int_0^{\Theta_H^{PFDI}} g_H(\theta) \cdot Swedish\_Exports_{ZS} d\theta + \int_0^{\Theta_H^{PFDI}} g_H(\theta) \cdot Swedish\_Exports_{ZR} d\theta$$
$$+ \int_{PFDI}^{\Theta_H^{HFDI}} g_H(\theta) \cdot Affiliate\_Exports_{ZH} d\theta + \int_{PFDI}^{\Theta_R^{HFDI}} g_R(\theta) \cdot Affiliate\_Exports_{ZR} d\theta$$
$$+ \int_0^{\Theta_R^{PFDI}} g_R(\theta) \cdot R\_Exports_{ZS} d\theta + \int_0^{\Theta_R^{PFDI}} g_R(\theta) \cdot R\_Exports_{ZH} d\theta$$

To say something on the Swedish world merchandise share, we need to know something about the export performance of all the other countries in the world. We do not have this information. Maybe it is sufficient to look instead at the ratio of Swedish aggregate exports to Swedish aggregate affiliate sales? Note that if the income of S rises, but not of H and R, i.e. catch up of China and India, then Θ_H^{PFDI} falls and Θ_H^{HFDI} remains unchanged. But then raises the share of export platform FDI, and of aggregate local sales. Swedish exports fall, but Swedish affiliate local sales rise. Since Swedish affiliate exports are not Swedish aggregate exports by definition, they capture in a sense exports by the world, we could also look at the ratio of Swedish aggregate exports to Swedish affiliate aggregate exports.

9.3 Obtaining predictions on trade costs

Extending Anderson and van Wincoop (2003) to many industries, a simple multi-country pure exchange economy with Cobb-Douglas utility function on m industries and CES sub-utility functions each on n goods within an industry yields the following reduced form equation:

(1)

$$X_{ijkt} = \mu_{kt} \left(\frac{Y_{it} Y_{jt}}{Y_t^T} \right) \left(\frac{\tau_{ijkt}}{P_{ikt} P_{jkt}} \right)^{1-\sigma},$$

where X_{ijkt} is the bilateral export value of industry k from country i to country j in year t, τ_{ijkt} is trade cost, Y_{it}, Y_{jt}, Y_t^T are income in country i, j, and the entire world, $\sigma, \sigma > 1,$ is the substitution elasticity from the CES utility function, μ_k is the income share spent by the representative agents of all countries on goods of industry k, and P_{ikt} and P_{jkt} are the ideal CES price indices in countries i and j. We define the trade cost index in logarithm, $\ln \tau_{ijt}$, as:

(2)

$$\begin{aligned} ln\,\tau_{ijt} = a_{ot} + a_{1t} \cdot ln\,Distance_{ij} + a_{2t} \cdot commonborder_{ijt} + a_{3t} \cdot commonlanguage_{ijt} + a_{4t} \cdot island_{it} \\ + a_{5t} \cdot island_{jt} + a_{6t} \cdot landlocked_{it} + a_{7t} \cdot landlocked_{jt} + a_{8t}'\, commonRTA_{ijt}, \end{aligned}$$

where $Distance_{ij}$ is measured in kilometers between the capitals of the countries, *common border*$_{ij}$ and *commonlanguage*$_{ij}$ are dummy variables which takes the value 1 if countries i and j share a common border or a common language, respectively, *island* is a dummy variable for island, *landlocked* is a dummy variable with value 1 if a country has no access to a national harbor, *commonRTA*$_{ijt}$ is a vector of dummy variables with value 1 if two countries i and j are common members of the EU, NAFTA, MERCOSUR, CEFTA, CARICOM, ASEAN, PATCRA, ANZD, CACM, or USIS. The a_{lt}, l=0..8, are weighting factors of the index function.

Taking the logarithm of equation (1), inserting equation (2), adding a stochastic error term ε_{ijkt}, a variable for GDP per capita difference between the two partner countries, $RealGDPp.c.difference_{ijt}$, to capture inter-industry trade effects ignored by the model, and bilateral real exchange rates, $Realexchangerate_{ijt}$, to account for exchange rate fluctuations, we obtain the gravity estimation equation:

(3)

$$\begin{aligned} \ln X_{ijkt} - \ln\left(\frac{Y_{it}Y_{jt}}{P_{it}^{1-\sigma}P_{jt}^{1-\sigma}Y_t^T}\right) &= (1-\sigma)a_{1t} \cdot \ln Distance_{ij} + (1-\sigma)a_{2t} \cdot commonborder_{ijt} \\ &+ (1-\sigma)a_{3t} \cdot commonlanguage_{ijt} + (1-\sigma)a_{4t} \cdot island_{it} \\ &+ (1-\sigma)a_{5t} \cdot island_{jt} + (1-\sigma)a_{6t} \cdot landlocked_{it} + (1-\sigma)a_{7t} \cdot landlocked_{jt} \\ &+ (1-\sigma)a_{8t}'\, commonRTA_{ijt} + (1-\sigma)a_{0t} + \ln \mu_{kt} \\ &+ b_{1t} \cdot Realexchangerate_{ijt} + b_{2t} \cdot RealGDPp.c.difference_{ijt} + \varepsilon_{ijkt}, \end{aligned}$$

The left hand side is proxied on one hand by bilateral industry imports in US dollar and deflated by the US consumer price index, and on the other hand by the real GDP of countries i and j and its sum over all countries in the sample. Hereby, we assume that consumer price indices are sufficiently good proxies for the ideal CES price indices from theory. Furthermore, we measure $\ln \mu_{kt}$ as the logarithm of an industry k's average consumption value (production+import value-export value) in countries GDP over all countries in the sample. The gravity equation is estimated by OLS separately for each year and industry, yielding industry specific and time varying estimation coefficients. From the estimated coefficients in (3), we can get a prediction of the trade costs in (2) assuming a specific value of the substitution elasticity σ.[24]

GDP data are from Penn World Tables, import, export and production values are from Nicita and Olareaga (2006) drawing from the COMTRADE database, geography variables are from Rose (2005, and nominal exchange rates and consumer price indices are from World Development Indicators. The dataset on bilateral industry imports covers the years 1978-2000, 28 manufacturing industries of the isic2/3 classification, and up to 158 countries.

To avoid sample selection problems in the time dimension, we require a bilateral country pair of an industry to be included in the sample only if there are data for at least 21 out of 23 possible years. To smoothen the potential business cycle and exchange rate valuation effects, we take a 5 years moving average over the predicted trade cost measure. The moving average of the year 1980 is referred back to the RIIE data of the year 1978.[25]

To capture the trade barrier that is faced by exports from Swedish affiliates abroad to third countries, we calculate a distance weighted average of bilateral import barriers of all countries i with respect to imports from a host country j in a year t and an industry k:

[24] We use a substitution elasticity of 5.

[25] The dataset of Nicity and Olarreaga (2006) contains also the years 1976 and 1977. However, coverage turned out to be too incomplete and caused serious selection bias over time. Therefore, these two years were not used.

(4)

$$trade\_cost\_neighbour_{jkt} = \sum_i \frac{ln\,\tau_{ijkt}}{distance_{ij}}.$$

We need to take an average value, since we do not know exactly the destination to which affiliates' exports are directed. However, destinations closer to a host country are more likely to be a recipient and their trade measure obtains larger weight in our *trade_cost_neighbour* measure. Again, we are careful in including only countries i for which this measure is available for all years in the sample to avoid sample selection bias in the time dimension.

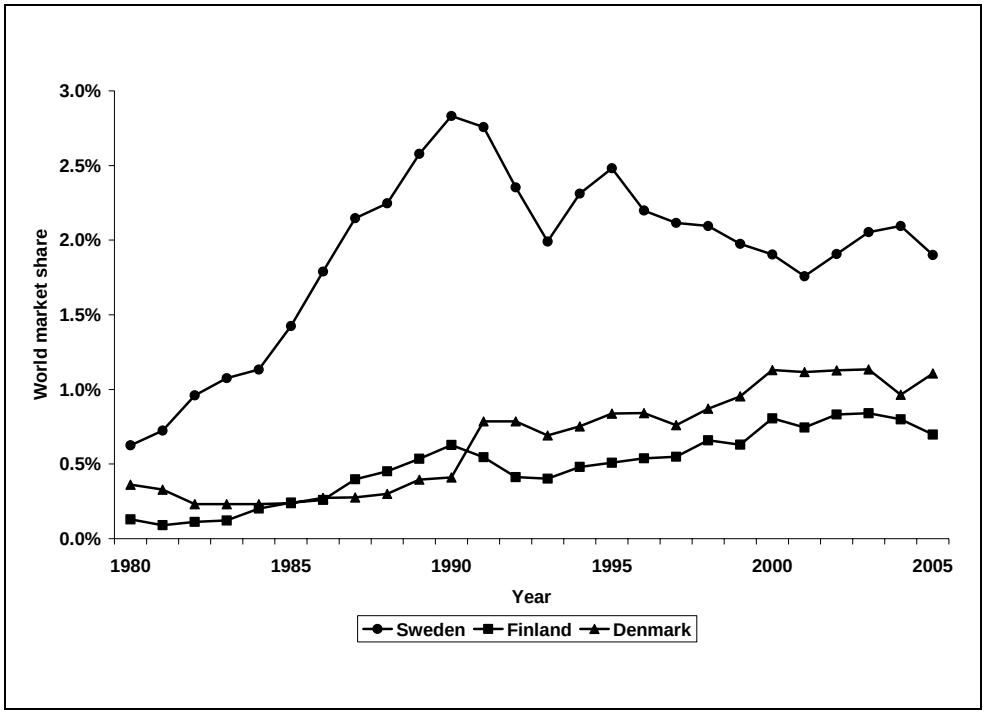
10 Additional figures and tables

Outward FDI stocks as a percentage of GDP and exports for EU25 +

	Share of GDP						Share of Exports					
	1980	**1985**	**1990**	**1995**	**2000**	**2005**	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**
Sweden	***2.7***	***10.2***	***20.9***	***29.2***	***50.9***	***56.7***	***11.6***	***35.3***	***88.2***	***91.0***	***141.4***	***155.4***
Denmark	3.0	3.0	5.4	13.6	45.7	45.6	12.3	10.5	19.8	48.5	142.5	138.6
Finland	1.4	3.3	8.1	11.5	43.2	38.5	5.2	13.4	42.3	37.0	113.0	112.5
Germany	4.7	8.5	8.9	10.6	28.5	34.6	22.4	32.6	37.0	51.3	98.2	99.5
Austria	0.7	1.6	2.9	4.9	12.8	22.0	3.0	6.3	11.5	20.5	36.6	53.6
Bel+Lux	4.6	10.6	18.9	26.5	71.3	104.2	9.3	17.8	34.4	43.4	91.3	115.4
France	3.5	6.9	8.9	13.0	33.5	40.1	20.5	37.0	50.7	67.7	135.8	183.8
Greece			3.4	2.4	5.3	5.9			35.6	26.6	51.8	77.4
Ireland		70.1	36.0	28.4	29.0	58.4		139.7	72.5	42.7	36.1	107.3
Italy	1.6	3.8	5.3	9.4	16.4	16.7	9.4	21.6	35.3	45.5	74.9	78.5
Netherlands	22.7	34.7	34.8	39.9	79.0	102.7	49.6	61.4	81.1	85.0	131.0	157.6
Portugal	1.6	2.2	1.2	3.2	17.4	24.3	11.0	10.3	5.5	15.7	80.2	116.4
Spain	0.8	2.5	3.0	5.8	28.9	33.9	9.3	18.4	28.2	35.4	145.5	197.7
UK	15.0	22.0	23.2	26.9	62.2	56.3	73.0	99.0	123.8	128.1	314.4	321.6
Canada	9.0	12.3	14.8	20.3	33.3	35.3	35.1	47.4	66.4	61.4	85.9	111.1
United States	7.7	5.7	7.4	9.5	13.4	16.4	95.5	108.9	109.4	119.5	168.3	226.1
Mexico	0.8	1.0	1.0	1.5	1.4	3.6	9.1	7.5	6.6	5.3	5.0	13.1
Japan	1.9	3.3	6.7	4.6	6.0	8.5	15.0	24.8	70.0	53.8	58.1	65.0
China		0.3	1.2	2.5	2.6	2.3		3.3	7.2	11.9	11.1	6.1
Korea	0.2	0.5	0.9	2.0	5.2	4.6	0.7	1.5	3.5	8.2	15.6	12.8
India	0.0	0.0	0.0	0.1	0.4	1.2	0.9	1.0	0.7	1.6	4.4	9.6
Norway	0.9	1.7	9.4	15.2	217.2	123.6	3.0	5.5	32.0	53.6	603.7	358.2
Switzerland	19.6	25.3	27.9	44.9	92.4	106.9	72.5	91.4	103.6	174.5	281.8	313.5
Russia				0.6	7.8	15.7				2.9	19.1	49.4
Argentina	7.9	6.7	4.3	4.1	7.4	12.3	74.4	70.5	49.0	51.0	80.3	56.4
Brazil	16.9	17.7	9.4	6.3	8.6	9.0	191.5	153.8	130.7	95.6	94.3	60.5
EU 25	5.7	10.0	11.3	14.6	36.4	40.7	25.9	39.5	52.7	60.9	125.0	135.9

Source: UNCTAD

World market shares in outward FDI stocks



Source: UNCTAD